312

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DENVER, COLORADO

CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Ampex	600 Recorder	312-2
Ampex	620	312-3
Dumont	Ch. RA-350, RA-351 Tel. Rec.	312-4
General Electric	911, 912, 913	312-5
Hoffman	7B170, U, 7B182P, P2, 7M169, U, 7M181P, P2, 7W181P, 21B173, U, 21B176, S, U, 21B184, U, 21B185P, 21B188, U, U2, 21B191, C2, U, U2, 21B358, P, U, 21B360, 21B361U, U2, 21K186, U, U2, 21M172, U, 21M175, S, U, 21M183, P, U, 21M184P, 21M187, U, U2, 21M190, C2, U, U2, 21M357, P, U, 21M360, U, U2, 21P177, S, U, 21P185, 21P192, C2, U, U2, 21P359, P, U, 21P362, U, U2, 21U205S, U, 21W190, C2, U, U2, 21W360, U, U2, 21-189, U, U2 (Ch. 303-17, -21, 306-21, -21B, -21U, 307-21, 308-21, 309-21, -21U, -21U2, 309A-21, -21U, 310-21, -21C2, -21U, -21U2) Tel. Rec.	312-6
Magnavox	Ch. CR-716AA	312-7
Motorola	Y21K37B, BA, BR, BRA, Y21K39, B, Y21K40, B, Y21K48B, M, Y21T26B, BA, BR, BRA, CH, CHA, Y21T27B, MA, PK, Y21T28, B, 21K37B, BA, BR, BRA, 21K39, B, 21K40, B, 21K48B, M, 21T26B, BA, BR, BRA, CH, CHA, 21T27B, MA, PK, 21T28, B (Ch. TS-534, Y, YB, VTS-534, Y, WTS-534, Y)	312-8
Packard-Bell	21SC1, -U, 21ST1, -U, 24ST1, -U (Ch. 88S1, -U) Tel. Rec.	312-9
RCA Victor	21-D-641, U, 21-D-645, U, 21-D-647, U, 21-D-648, U, 21-D-652, U, 21-D-667, U, 21-D-670, U, 21-T-635, U, 21-T6125, U, 21-T-6127, U, 24-D-655, U, 24-D-658, U, 24-D-673, U, 24-D-676, U, 24-D-679, U, 24-T-6142, U, 24-T-6285, U, 24-T-6287, U (Ch. KCS97, A, AA, AB, AC, AD, C, D, E, F, H, J, K, N, P, R, T, U, W) Tel. Rec.	312-10
RCA Victor	21T392, U, 21T393, U (Ch. KCS83F, H, Radio Ch. RC-1111C, RC-1117B & Audio Ch. RS-141D) Tel. Rec. Prod. Chg. Bul. 150	312-1

Special (front)

Chevrolet 985986 312-12S

Zenith. Y18142Y - Y1816C-E-R. (Ch. 16Y20) 312-12S

PhiLco 22T4033-22D4135-4137-4139-434-
Chassis 332-U 312-11-S

PhiLco 22T4148-4162-4163-4164 (Ch. TV-440)
PhiLco 24T6126L-M-246320C-M (Ch. 444 TV) 312-11-S

The PHOTOFACT Servicer

Vol. 32. Nos. 311 & 312 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ March 1, 1956

The service information in this Servicer provides data on models which we have been unable to present in PHOTOFACT Folders. The receivers are not in current production; a requirement for PHOTOFACT coverage, and we are therefore presenting schematics and supplementary data that will be of assistance when servicing these models.

PRODUCTION CHANGES — SILVERTONE CHASSIS 528.239, -1

This diagram has incorporated the following changes, which were made on those chassis as production progressed, in order to make certain improvements. These changes are not retroactive. If you have an early production chassis which does not include the changes below, do not make the change except to correct an actual complaint.

In order to eliminate possible breakdown due to over voltage, capacitor C55 was relocated. The negative end of this capacitor, formerly connected to C49, is now connected to the junction of R41 and T5 as shown. With this change chassis 528.239 became 528.239-1.

On some later chassis a 100 ohm, 10 watt resistor has been added at the center tap of the high voltage secondary winding of the power transformer. This occured in all cases where the secondary voltage exceeded 440 volts. In all cases where the secondary voltage does not exceed 440 volts, the resistor is not used. (This change is not reflected on this diagram.)

To allow for deviations in operation which certain of the horizontal output transformers (T9) used on later models of chassis 528.239 have exhibited, the screen dropping resistor (R68) of the horizontal output tube (V14) has been changed from 15K ohm, 5 watt, 10%— as shown here—to 18K ohm, 5 watt, 10%. These transformers may be identified by the 6 digit number stamped in white on the side. Only if the first three digits of this number read "198" is this change applied. In all other cases the 15K ohm resistor is used.

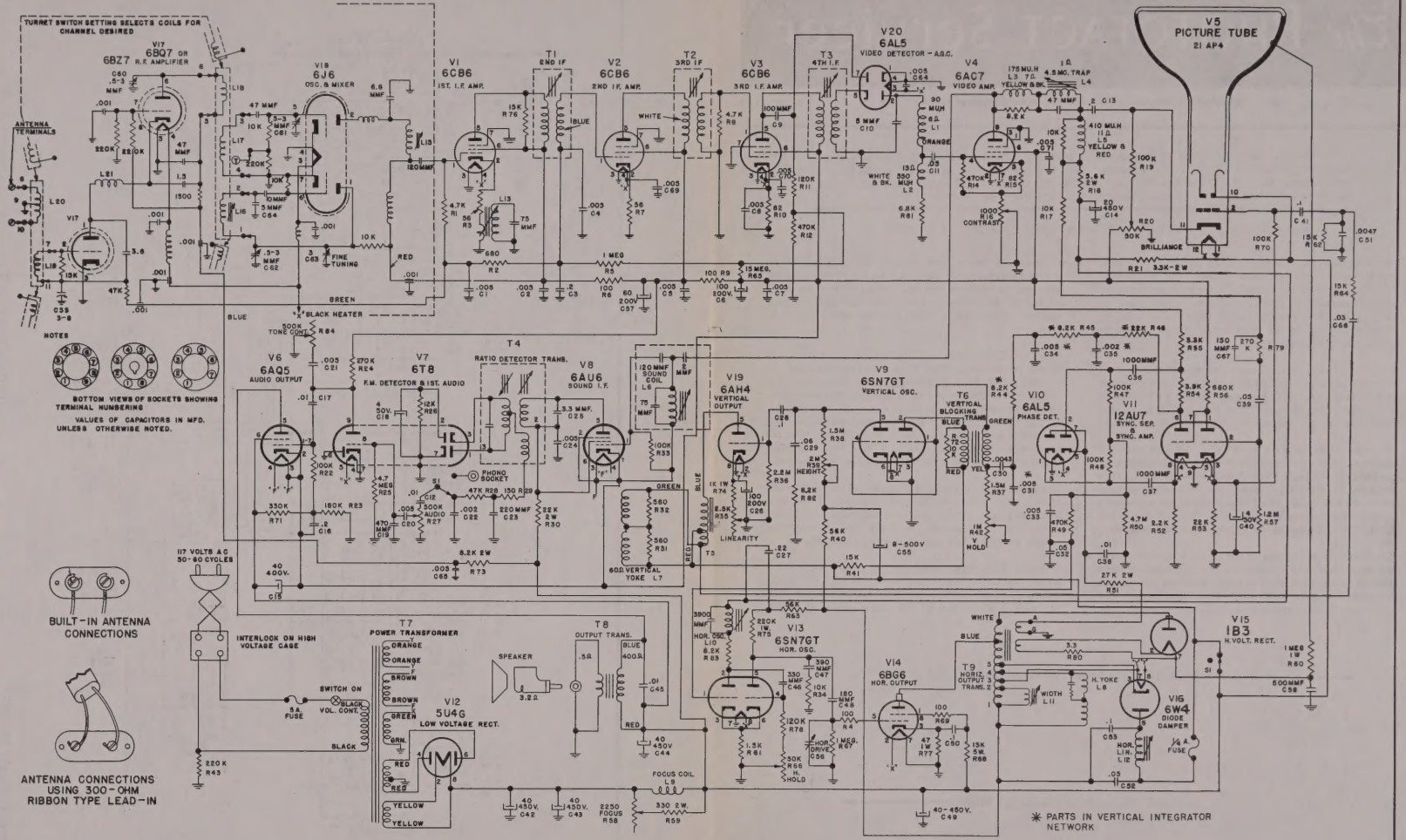
Capacitor C15, connected from cathode to screen grid of the audio output tube (V6), has changed value. A 40 mfd., 250 volt capacitor on some early models of chassis 528.239, it is now a 40 mfd., 400 volt capacitor, as shown. Also in some early 528.239 models, a 0.25 mfd., 400 volt capacitor was connected from the horizontal deflection coils to terminal #1 of the horizontal output transformer (T9). This capacitor is no longer used and does not appear on this diagram.

Capacitor C30, connected from the vertical blocking transformer (T6) to the plate circuit of the sync separator tube (V11), has changed value. A 0.0047 mfd., 600 volt capacitor in early 528.239 models, it is now a 0.0043, 600 volt capacitor, as shown.

Resistor R78, connected from the output section grid to cathode of the horizontal oscillator tube (V13), has changed value. A 180K ohm resistor in early models of 528.239, it is now a 120K ohm resistor as shown.

← Schematic Diagram Silvertone Chassis 528.239, 528.239-1

Schematic Diagram Chevrolet Model 985986 →



Silvertone Chassis 528.239, 528.239-1

Schematic Diagram Courtesy of Sears Roebuck & Co.

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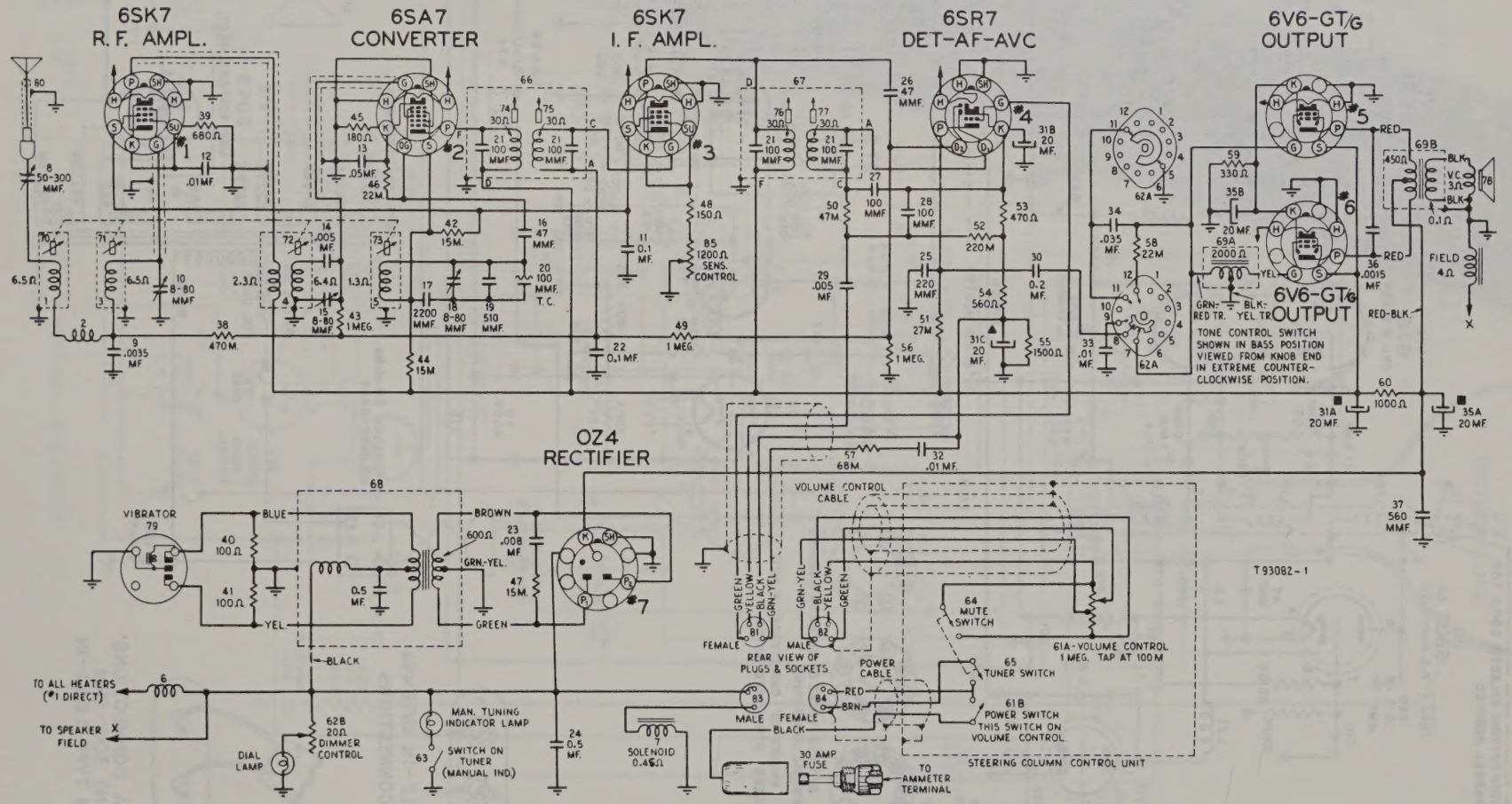

Chevrolet Model 985986

Schematic Diagram Courtesy of Chevrolet Motor Car Co.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 8 IN SET 242

RCA VICTOR MODELS 21T392, U, 21T393U (Ch. KCS83F, H, Radio Ch. RC-1111C, RC-1117B, Audio Amp. Ch. RS-141D

RCA Victor chassis KCS83 Series was covered in Photofact Folder 8 – Set 242.

Models 21T392, 21T392U, 21T393 and 21T393U are electrically identical to the models covered, except for the following changes.

Model 21T392 (Ch. KCS83F) also features an AM radio (Ch. RC-1117B).

Model 21T392U (Ch. KCS83H) employs tuner (part #KRK-12A) and radio chassis RC-1117B.

Model 21T393 (Ch. KCS83F) features an AM-FM radio (Ch. RC-1111C) and audio amplifier Ch. RS-141D.

Model 21T393U (Ch. KCS83H) employs tuner (part #KRK-12A), radio Ch. RC-1111C and audio amplifier Ch. RS-141D.

For information concerning radio chassis RC-1111C, RC-1117B and audio amplifier chassis RS-141D see Photofact Folder 6 in Set 202.

A schematic of tuner KRK-12A and proper alignment procedure are given in this bulletin.

PRODUCTION CHANGES
BULLETIN 150

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

It is necessary to meter the non-oscillating plate current of the 6S4 voltage control tube. This can be accomplished by use of an adaptor or similar arrangement. The circuit diagram for the adaptor is shown in Fig. 1.
Remove the 6S4 from its socket and insert the adaptor plug. Plug 6S4 into the socket. Connect a 0-50MA meter to adaptor and turn the switch on.
Remove the tuner cover shield.
Set channel selector midway between channels to disable local oscillator. Some tubes may oscillate even with the tuned circuits disengaged.
As a check, short circuit the spring contacts 12 and 13 nearest the tuner front (contacts are at zero DC potential). If plate current rises, keep the contacts shorted while adjusting the oscillator voltage control for 28MA indication on the meter.
Replace tuner shield.
The oscilloscope used should have a sensitivity of 1 millivolt per inch. If sensitivity is less a suitable preamplifier may be used with the scope.
A heterodyne frequency meter is used while making VHF oscillator adjustments.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characterisitic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	57MC (20MC Swp)	55.25MC 59.75MC	2	Vert. Amp. to point (A). Low side to chassis.	A1, A2, A3, A4	Ground AGC line at tuner terminal board. Turn off adaptor switch removing plate voltage from oscillator. Adjust for response similar to Fig. 2B. Do not exceed limits shown in Figs. 2A and 2C. Each channel strip adjustment for an individual channel strip has a corresponding adjustment on all other VHF channel strips. Since these adjustments are identical in position and function they are indicated bye same "A" number in the interests of simplification. Adjustments A1, A2, A3 are accessible thru holes in top of tuner as the channel switch is turned to each channel. Adjustment A4 refers to coupling capacitor whose positioning affects bandwidth of response curve. Attenuate sweep generator to prevent excessive signal input to tuner as indicated by valley rising above 50%. See Fig. 2B.
			63MC (20MC Swp)	61.25MC 65.75MC	3			
			69MC (20MC Swp)	67.25MC 71.75MC	4			
			79MC (20MC Swp)	77.25MC 81.75MC	5			
			85MC (20MC Swp)	83.25MC 87.75MC	6			
			177MC (20MC Swp)	175.25MC 179.75MC	7			
			183MC (20MC Swp)	181.25MC 185.75MC	8			
			189MC (20MC Swp)	187.25MC 191.75MC	9			
			195MC (20MC Swp)	193.25MC 197.75MC	10			
			201MC (20MC Swp)	199.25MC 203.75MC	11			
			207MC (20MC Swp)	205.25MC 209.75MC	12			
			213MC (20MC Swp)	211.25MC 215.75MC	13			

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2. Turn off sweep generator and remove scope from point (A). Turn AGC control fully clockwise. Remove the ground placed on the AGC line in step 1. Connect the potentiometer arm of the bias supply to the tuner AGC terminal. Connect the positive lead to the tuner case. Adjust for -3.5 volts at AGC terminal. Connect the potentiometer arm of a second bias supply to point (C). Connect the positive lead to chassis. Adjust for -5 volts at point (C). Turn on the 6S4 adaptor switch to apply plate voltage to oscillator. Connection for the heterodyne frequency meter is made as follows: Insert the end of an insulated piece of wire into either of two holes next to the oscillator tube at the top right front corner of the tuner. Use care so that the wire does not touch any tuner circuits. Connect other end of wire to RF input of frequency meter.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.		Connect frequency meter as in step 2.	Not used	Freq. meter to 257MC	13	Not used	A6	Set fine tuning control to its mid-range position. Adjust for audible beat on frequency meter.
4.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	213MC (20MC Swp)	211.25MC 215.75MC	13	Vert. Amp to point (B). Low side to chassis. (Use 3 to 5 volts peak to peak on scope)	A7, A3	Adjust A7 for maximum gain on scope. Adjust A3 for maximum gain and flat topped curve. Recheck A7 for maximum gain at center of band. Maximum gain and flat top response should occur simultaneously.
5.		Connect frequency meter as in step 2.	Not used	Freq. meter to 251MC	12	Not used	A6, A3	Adjust A6 on each channel for audible beat. Connect sweep generator and scope as in step 4. Set sweep and marker generators to proper frequencies (see chart) for each channel and adjust A3 if necessary for maximum gain and proper response,
				245MC	11			
				239MC	10			
				233MC	9			
				227MC	8			
				221MC	7			
				129MC	6			
				123MC	5			
				113MC	4			
				107MC	3			
				101MC	2			
6.	Direct	High side to point (D) Low side to chassis.	Not used	43.5MC (400∿Mod)	Any not used locally	Vert. Amp to point (B). Low side to chassis.	A5	Adjust for MINIMUM 400∿ indication on scope.

KRK12A UHF TUNER ALIGNMENT

Alignment of the UHF portion of the tuner should not be attempted unless the following test equipment is available, in addition to the usual VHF test equipment: UHF sweep generator covering the frequency range of 470 to 890MC. A marker generator of crystal accuracy covering the same frequency range. Leave the 6S4 adaptor connected as under KRK-12A. VHF tuner alignment.

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	10DB Attenuator pad	Thru attenuator pad to antenna terminals. Connect UHF marker generator loosely to antenna terminals	Set sweep to cover channel being aligned (See chart) Use 20MC sweep width	Set to video and sound frequencies of channel being aligned (see chart)	14 thru 83	Vert. Amp to point (A). (Thru preamp. if necessary). Low side to chassis.	A8, A2, A3	Turn off adaptor switch removing plate voltage from the oscillator. Ground the AGC line at the tuner terminal board. Adjust for maximum gain, symmetrical response curve centered about the pass band. See Fig. 3 for acceptable variations.

8. Connect both bias supplies and adjust as in step 2. Remove the ground from the AGC line. Turn the adaptor switch to supply plate voltage to the oscillator. Connect the VHF signal generator to point (A) using very short leads. Set the VHF generator to 45.75MC for the remainder to tuner alignment.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	10DB Attenuator pad	Thru attenuator pad to antenna terminals. Connect UHF marker generator loosely to antenna terminals.	Set sweep to cover channel being aligned (See chart) Use 20MC sweep width	Set to video carrier frequency of channel being aligned. (See chart).	14 thru 83	Vert. Amp to point (B). Low side to chassis.	A6	Adjust A6 for channel strip being aligned until 45.75MC marker and video carrier marker coincide on response curve similar to Fig. 4. Adjust A3 of channel strip being aligned for maximum gain with proper wave shape. Connect the DC probe of VTVM to point (A). Common to chassis. Set UHF oscillator injection adjustment for reading on VTVM between 0.1 volt and 0.3 volt on all channels.

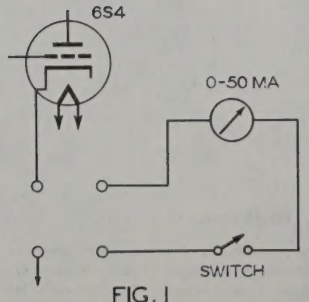


FIG. 1

FIG. 2A

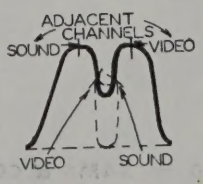


FIG. 2B

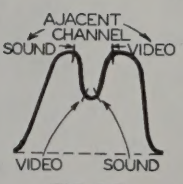


FIG. 2C

FIG. 3

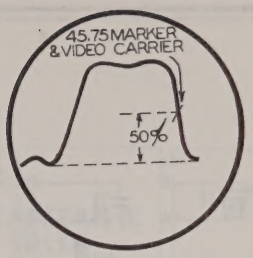
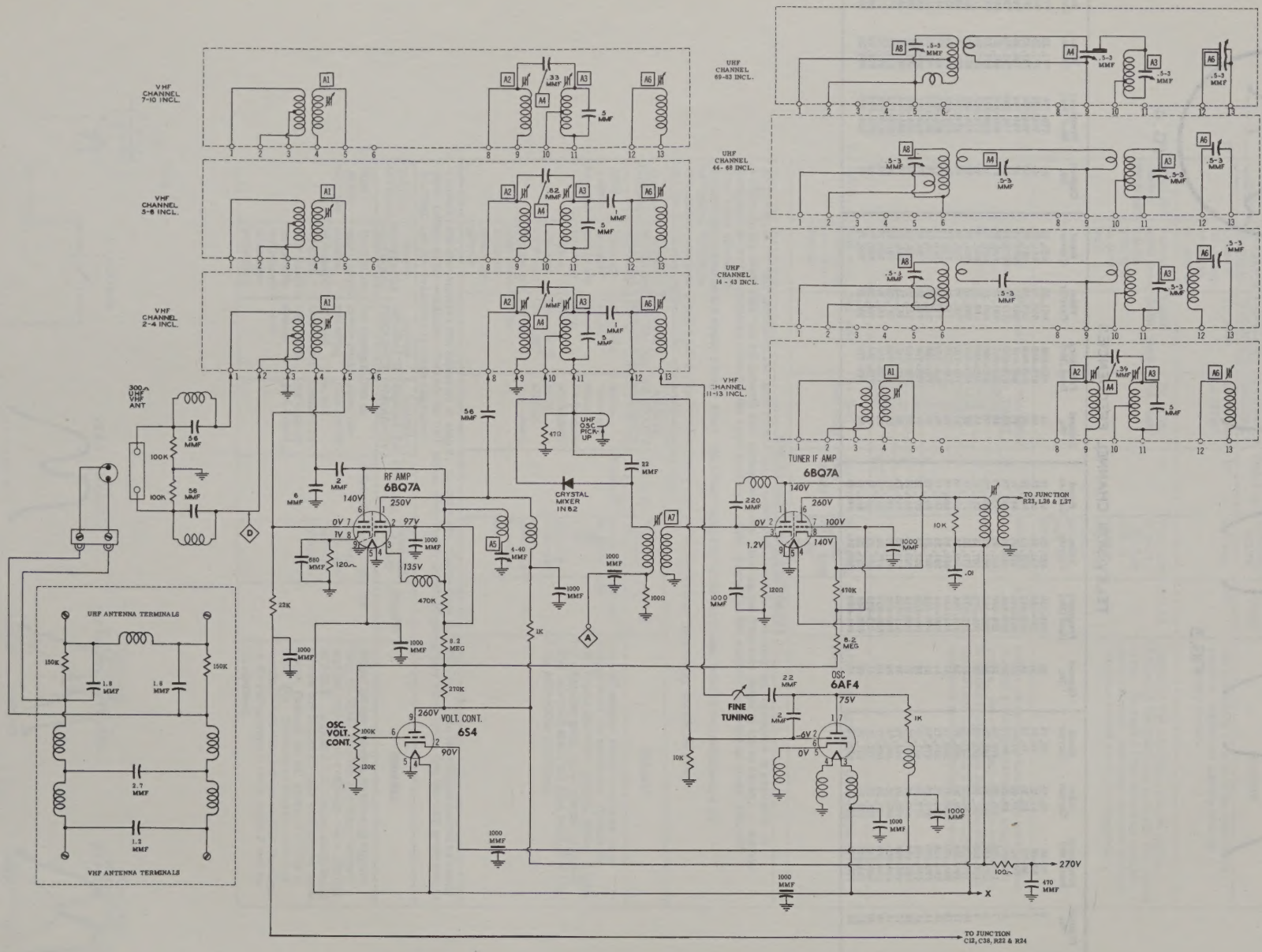


FIG. 4

TELEVISION CHANNEL FREQUENCIES

Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier
2	54-60	55.25	59.75	23	524-530	525.25	529.75	44	650-656	651.25	655.75	64	770-776	771.25	775.75
3	60-66	61.25	65.75	24	530-536	531.25	535.75	45	656-662	657.25	661.75	65	776-782	777.25	781.75
4	66-72	67.25	71.75	25	536-542	537.25	541.75	46	662-668	663.25	667.75	66	782-788	783.25	787.75
5	76-82	77.25	81.75	26	542-548	543.25	547.75	47	668-674	669.25	673.75	67	788-794	789.25	793.75
6	82-88	83.25	87.75	27	548-554	549.25	553.75	48	674-680	675.25	679.75	68	794-800	795.25	799.75
7	174-180	175.25	179.75	28	554-560	555.25	559.75	49	680-686	681.25	685.75	69	800-806	801.25	805.75
8	180-186	181.25	185.75	29	560-566	561.25	565.75	50	686-692	687.25	691.75	70	806-812	807.25	811.75
9	186-192	187.25	191.75	30	566-572	567.25	571.75	51	692-698	693.25	697.75	71	812-818	813.25	817.75
10	192-198	193.25	197.75	31	572-578	573.25	577.75	52	698-704	699.25	703.75	72	818-824	819.25	823.75
11	198-204	199.25	203.75	32	578-584	579.25	583.75	53	704-710	705.25	709.75	73	824-830	825.25	829.75
12	204-210	205.25	209.75	33	584-590	585.25	589.75	54	710-716	711.25	715.75	74	830-836	831.25	835.75
13	210-216	211.25	215.75	34	590-596	591.25	595.75	55	716-722	717.25	721.75	75	836-842	837.25	841.75
14	470-476	471.25	475.75	35	596-602	597.25	601.75	56	722-728	723.25	727.75	76	842-848	843.25	847.75
15	476-482	477.25	481.75	36	602-608	603.25	607.75	57	728-734	729.25	733.75	77	848-854	849.25	853.75
16	482-488	483.25	487.75	37	608-614	609.25	613.75	58	734-740	735.25	739.75	78	854-860	855.25	859.75
17	488-494	489.25	493.75	38	614-620	615.25	619.75	59	740-746	741.25	745.75	79	860-866	861.25	865.75
18	494-500	495.25	499.75	39	620-626	621.25	625.75	60	746-752	747.25	751.75	80	866-872	867.25	871.75
19	500-506	501.25	505.75	40	626-632	627.25	631.75	61	752-758	753.25	757.75	81	872-878	873.25	877.75
20	506-512	507.25	511.75	41	632-638	633.25	637.75	62	758-764	759.25	763.75	82	878-884	879.25	883.75
21	512-518	513.25	517.75	42	638-644	639.25	643.75	63	764-770	765.25	769.75	83	884-890	885.25	889.75
22	518-524	519.25	523.75	43	644-650	645.25	649.75								


VHF CHANNEL 7-10 INCL.
VHF CHANNEL 5-6 INCL.
VHF CHANNEL 2-4 INCL.
UHF CHANNEL 69-83 INCL.
UHF CHANNEL 44-68 INCL.
UHF CHANNEL 14-43 INCL.
VHF CHANNEL 11-13 INCL.
TUNER IF AMP 6BQ7A
300Ω UHF VHF ANT
RF AMP 6BQ7A
CRYSTAL MIXER 1N82
UHF OSC PICK-UP
OSC 6AF4
FINE TUNING
OSC. VOLT. CONT.
VOLT. CONT. 6S4
UHF ANTENNA TERMINALS
VHF ANTENNA TERMINALS
TO JUNCTION R23, L30 & L27
TO JUNCTION C12, C36, R22 & R24
270V

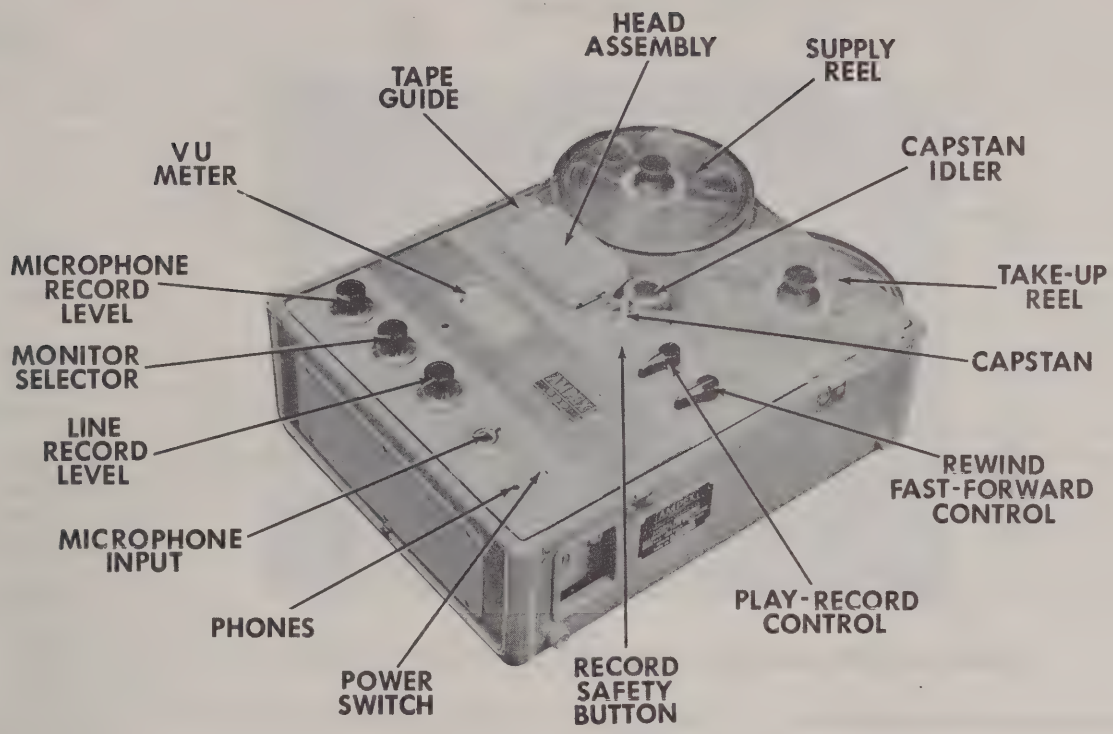


Figure 1

GENERAL INFORMATION

The Ampex Model 600 is a lightweight portable tape recorder designed to meet the needs of both professional and non-professional users in remote pickups, custom home installations, and studio applications.

The Model 600 may be operated in either the horizontal or the vertical position. If the machine is left in its carrying case, "installation" consists only of making up and connecting the required cables. For studio installations, an adaptor (Cat. No. 9376) designed to permit mounting in a standard 19-inch relay rack may be used.

Operating modes of Standby, Play, Record, Rewind, and Fast Forward are accomplished in this unit through a system of pulleys, belts, and clutches driven by a single-speed synchronous motor. The correct sequence of movements is maintained when the mechanism is started or stopped in any one of the operating modes. An interlock is provided between the "Play-Record" and "Rewind-Fast Forward" controls to prevent the turning of either when the other is in an operating position. The interlock prevents accidental erasing of tape and prevents breaking or spilling of tape should the controls be mishandled.

The Ampex 600 is equipped with either full or half-track heads and is designed to handle 7-inch or smaller reels and to operate at a tape speed of 7 1/2 inches per second.

Manufactured by:

Ampex Corporation
934 Charter Street
Redwood City, California

FOR SERVICE INFORMATION ON THE AMPEX MODEL 620 AMPLIFIER, SOMETIMES USED IN CONJUNCTION WITH MODEL 600 RECORDER, SEE FOLDER 3 IN THIS SET.

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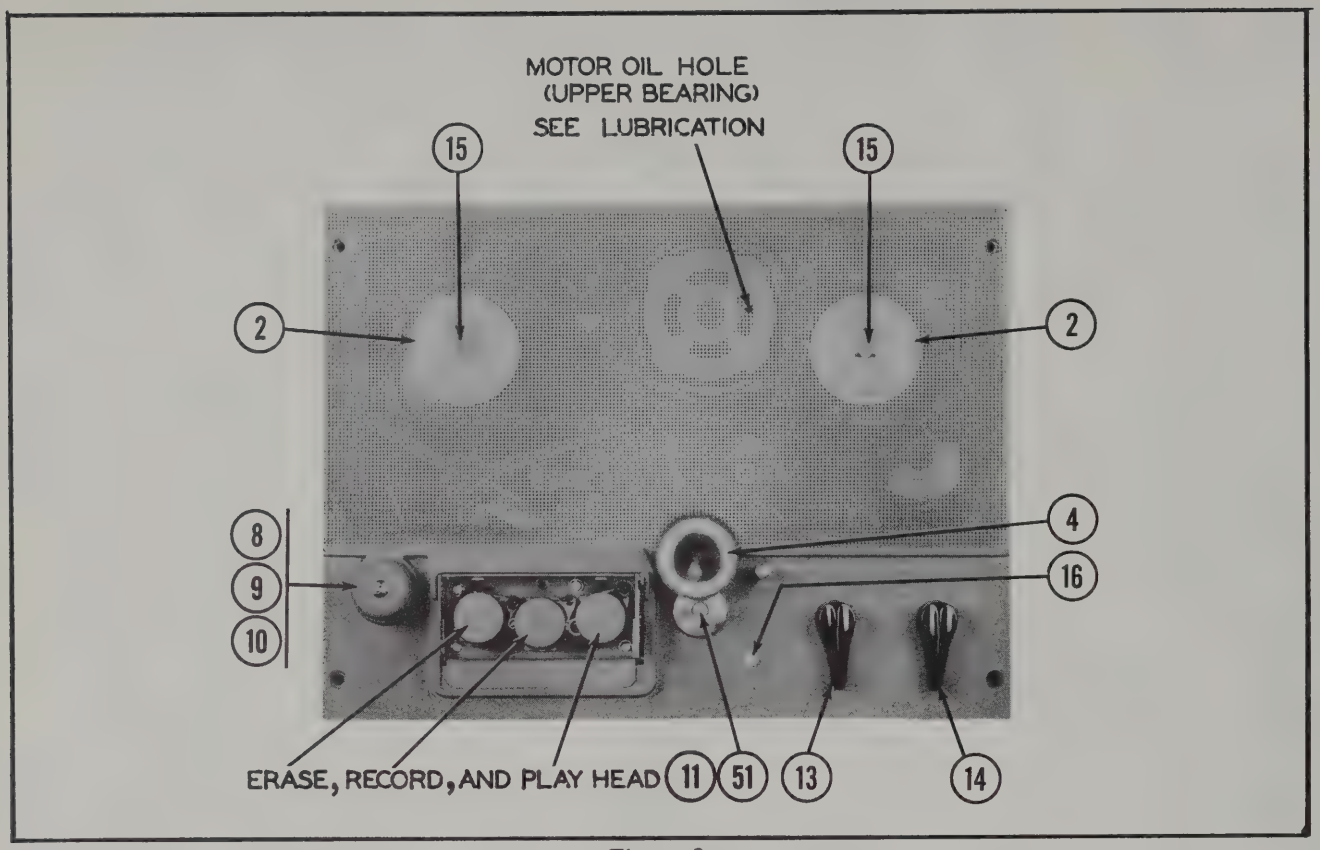


Figure 2

TABLE OF CONTENTS

	Page
SPECIFICATIONS	2
INSTALLATION AND OPERATION	3
TAPE TRANSPORT ASSEMBLY	4
ROUTINE MAINTENANCE	5
LUBRICATION	6
MECHANICAL TROUBLE SHOOTING	6
EXPLODED VIEW	10-11
MECHANICAL ADJUSTMENTS	12
OVERALL PERFORMANCE CHECKS	13
ELECTRONIC ALIGNMENT	14
SCHEMATIC	17
ELECTRICAL PARTS LIST	19
MECHANICAL PARTS LIST	20

SPECIFICATIONS

Tape Speed-

7 1/2 inches per second, full track.

Reel Size-

7 inch RTMA reel maximum.

Frequency Response-

40 to 15,000 cycles per second. ±2db from 50 to 10,000 cycles per second and down no more than 4db at 15KC.

Signal To Noise Ratio-

Over 55db below Peak Record Level (defined as 3% total rms harmonic distortion when measured on 400 cycle tone; noise includes bias, erase, and playback amplifier noise).

Flutter And "Wow"-

Below 0.25%.

Starting Time-

Instantaneous — (tape accelerates to full play-record speed in less than one second).

Stopping Time-

Less than one second.

Playing Time-

32 minutes with 7 in. reel (1200 feet)

Fast Forward Or Rewind Time-

90 seconds for full 1200-foot reel.

Playback Timing Accuracy-

±0.2% (±3.6 seconds in a 30 minute recording).

Operating Modes-

Play-Record: Selector Switch (safety button must be depressed when going from "Play" to "Record").

Fast Forward-Rewind: Selector Switch (interlocked with "Play-Record" Switch).

Level Controls-

Separate Mixing Controls: Microphone Record Level, and Line Record Level.

Record Inputs-

Microphone: Accomodates any high impedance microphone (may be modified for low impedance microphone by adding accessory transformer).

Line: 0.5 volt required for program level (1% distortion).

Playback Output-

1.25 Volts to 10,000 ohms at program level.

Monitoring-

Phone jack and illuminated VU meter. Either program input or playback output may be monitored while recording, depending on position of "Monitor Selector Switch".

Head Assembly-

Separate erase, record, and playback heads contained in a single housing.

Power Requirements-

117 volts, 60 cycles; .52 amperes, 61 watts.

Dimensions-

Tape Transport: 9 5/16" x 12 1/2" x 5"
Electronics: 6 1/8" x 12 1/2" x 5"
Overall Size, Inc. Case: 16 1/2"x 13 3/4" x 8"

Weight-

26 pounds, including case.

Accessories-

Low impedance microphone transformer kit: Catalog No. 9359.

INSTALLATION AND OPERATION

Input, Output, And Power Cables-

A power cable and matching plugs for the Microphone, Line Input, and Output connectors are supplied with the machine.

Shielded, low-capacity cable is recommended for making up input and output cables. It is considered good practice to make such cables as short as is consistent with convenience in interconnecting units in any audio system.

Impedance Matching, Signal Levels, and Equalization-

The following general requirements and observations should serve as a guide in interconnecting the machine with any other piece of equipment:

1. The unit to which the 600 is to be connected for playback should have an input impedance of 10,000 ohms or more. If the machine is to work into a 600-ohm studio line, a bridging transformer or some other impedance-matching device will be required.

2. Any unit to be connected to the "Line Input" of the Model 600 should deliver a signal of at least 0.5 volt. The "Line Input" is used in recording from tuners, phonographs, or other tape recorders.

3. Phonographs with crystal pickups may be connected directly to the "Line Input" when copying disc recordings. For phonographs with variable reluctance or other low-level pickups, the output of the phonograph pre-amplifier should be used. Regardless of the type of pickup, the phonograph should be properly equalized as recommended by its manufacturer to produce a flat program input to the Model 600.

4. If a tuner to be used in making recordings has more than one output, use the one marked Detector. This output precedes any tone controls or other frequency compensating circuitry in the tuner, and provides an essentially flat program. If the tuner has only one output, and has integral tone controls, these controls should be set for flat response when making tapes.

Tape Threading-

1. Place a reel of tape on the left-hand turntable, and an empty reel on the right-hand turntable. Be sure that the pins around the base of each spindle engage the corresponding slots on the reel hubs.

2. Press a reel hold-down knob (1) in place on each spindle.

3. Thread the tape as shown in Fig. 1. and make a full turn counterclockwise around the hub of the empty reel. It is not necessary to anchor the tape in the slot on the reel hub.

To Record-

1. Thread a reel of tape on the machine. It is not necessary to erase previously recorded tapes before re-using them. Any previous program on the tape will be erased as the new program is recorded.

2. Turn the On-Off toggle switch to "On".

3. Turn the Monitor Selector to "Input".

4. Connect microphone, tuner, phonograph, or other program source to the appropriate input.

5. Adjust either the Microphone Record Level or the Line Record Level control (depending on whether the Microphone Input or the Line Input is being used) so that on the most intense peaks of volume of the program to be recorded, the panel meter swings up to approximately zero (0) on the VU scale. Note that it is unnecessary to put the tape in motion in order to set the program level. If only the Line Input is being used, turn the Microphone Record Level to zero (0). This will prevent any noise generated in the un-used microphone preamplifier from being recorded on the tape.

6. Turn the Record-Playback control to "Record".

IMPORTANT: This control cannot be put in the "Record" position unless the "Record Safety Button" near its lower left side is held down while the control is turned. This safety feature prevents accidental erasure of previously recorded tapes. It is not necessary to hold the "Record Safety" button down in order to return from the "Record" position to "Playback" or neutral (marked by a dot).

The machine is now recording. A continuous comparison of the incoming program and the program off the tape may be made while recording by turning the "Monitor Selector" back and forth between "Input" and "Tape" and observing the VU meter or using headphones.

To stop recording, return the "Record-Playback" control to neutral (marked by a dot).

To Play Back-

1. Thread a previously recorded tape on the machine.

2. Turn the Power switch "On".

3. Turn the Record-Playback control to "Playback".

4. Turn the Monitor Selector to "Tape".

5. Adjust the playback volume by using the volume control of the radio, tuner, amplifier, or sound system being used.

IMPORTANT: If the Model 600 ever fails to play back a tape, always check to see that the Monitor Selector is set on "Tape", before looking for trouble elsewhere. When the machine is in the "Play" mode, there will be no signal at the Output connector if the Monitor Selector is on "Input."

Rewind And Fast Forward-

1. The recorder may be placed in the Rewind or Fast Forward mode by turning the Rewind-Fast Forward control to the appropriate position.

IMPORTANT: The Rewind-Fast Forward control and the Play-Record control are mechanically interlocked so that it is impossible to turn one of them unless the other is in neutral. This safety feature eliminates the possibility of tape breakage which would almost invariably occur if the machine were switched directly from either of the high speed modes to "Play" or "Record".

2. The tape may be shuttled back and forth between Fast-Forward and Rewind without waiting for the tape to slow down or stop before changing its direction. Cueing and editing may be done at high speed with no danger of tape breakage.

CAUTION: To avoid tape stretch or breakage, never attempt to put the machine in the Play or Record mode while the tape is in motion. When going from Fast-Forward to Play, turn the Rewind-Fast Forward control to neutral, and wait until the tape stops before switching to Play.

Erasing-

1. To erase a previously recorded tape without recording a new program on it, turn both of the record level controls to zero (0), and run the tape through in the "Record" mode.

Mixing-

Since the microphone and line recording channels of the Model 600 are independent, and each has its own level control, it is possible to record simultaneously from two sources without using an external mixer.

To do this, connect a radio, tuner, or phonograph to the Line Input connector. Connect a microphone, and adjust both the Microphone Record Level and Line Record Level controls for the desired balance between the two programs, and record.

TAPE TRANSPORT ASSEMBLY

The Model 600 tape transport mechanism utilizes a single-speed synchronous motor and a system of pulleys, belts, and clutches to drive the capstan and turntables. Four modes of tape motion, (Play, Record, Rewind, and Fast Forward) are determined by two three-position controls located on the lower right side of the top plate. (The neutral position for each control is marked by a dot).

Standby Operation-

Power is applied to the drivemotor (55) when the power switch on the front panel of the amplifier is turned "On". The capstan (51) begins to rotate immediately, being driven by a nylon belt (54) running between the motor pulley (57) and the capstan flywheel (52). A second belt (53) running in a groove in the capstan flywheel drives the play takeup pulley (75). The shock relief brake roller assemblies (62) are engaged against the rubber-tired fast forward and rewind clutches (31 and 46). Both turntables are motionless when the machine is in standby.

Since the capstan is in motion when the machine is in standby, the tape will accelerate to full play or record speed almost instantly when the "Play-Record" control is operated, thus producing a wow-free start.

Play And Record Functions-

The operation of the machine in the "Record" mode is exactly the same as for the "Play" mode, except that the wafer switch at the end of the play actuator is closed, and the record amplifier and the bias and erase oscillator are operative. A mechanical interlock (17) between the Play and Record positions of the Play-Record control must be opened by depressing the Record Safety Button (16) before the control will go into the Record position.

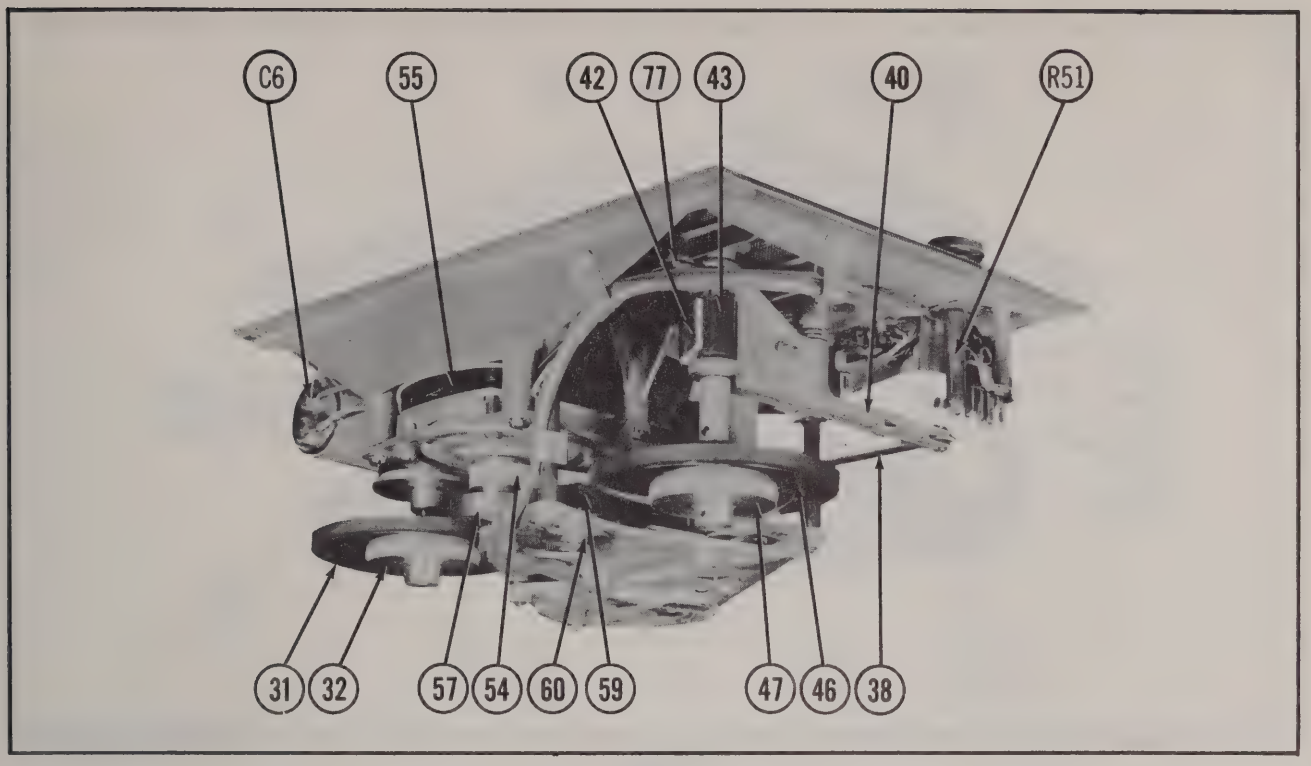


Figure 3

When the Play-Record control is turned to either Play or Record the following mechanical sequence occurs:

1. The play takeup pulley (75) and belt (53) are brought to bear on the play takeup clutch (28).

2. The shock relief brake assembly (62) on the play takeup side is released from the fast forward clutch tire (31).

3. The capstan idler (4) engages the capstan (51), which drives the tape, pulling it from the tape supply turntable (i.e. the rewind turntable) and feeding it to the takeup turntable, which now begins to rotate. It is especially important to understand that when the machine is operating normally in the play or record modes, the two modes in which the tape is clamped against the capstan by the capstan idler, the turntables are effectively isolated from each other. The takeup turntable, as its name implies, does nothing more than take up the tape fed to it by the capstan. It does not pull the tape from the tape supply turntable.

4. The shock relief brake assembly (62) on the rewind side remains engaged against the rewind clutch tire (46), and slippage between the clutch (46) and disc assembly (47) occurs. The friction produced in this slippage, and the friction produced by the rewind holdback brake (42) operating on the bakelite drum (43) provide the required holdback tension.

Rewind Mode-

The Rewind-Fast Forward control cannot be operated unless the Play-Record control is in neutral. When the Rewind-Fast Forward control is turned to Rewind:

1. Both shock relief brake assemblies (62) are released.

2. The rewind idler (59) is clamped between the motor pulley (57) and the rewind clutch tire (46) and the rewind turntable is driven.

3. Holdback tension is provided by the holdback brake (24) on the takeup assembly as tape is pulled from the takeup turntable.

Fast Forward Mode-

When the Rewind-Fast Forward control is turned to Fast Forward:

1. Both shock relief brake assemblies (62) are released.

2. The rubber-tired fast forward clutch (31) is brought to bear on the motor pulley (57), and drives the takeup turntable.

3. Holdback tension is produced by the holdback brake (42) on the rewind assembly.

ROUTINE MAINTENANCE

Routine maintenance of the tape transport mechanism consists primarily of periodic cleaning and lubrication.

Cleaning- All surfaces that come in contact with the tape (tape guide, heads, capstan, capstan idler) should be cleaned regularly with ethyl alcohol applied with a soft, lint-free cloth. Particular attention should be given to cleaning the capstan idler and the capstan, both of which will tend to pick up the lubricant with which most tape is impregnated. Failure to remove

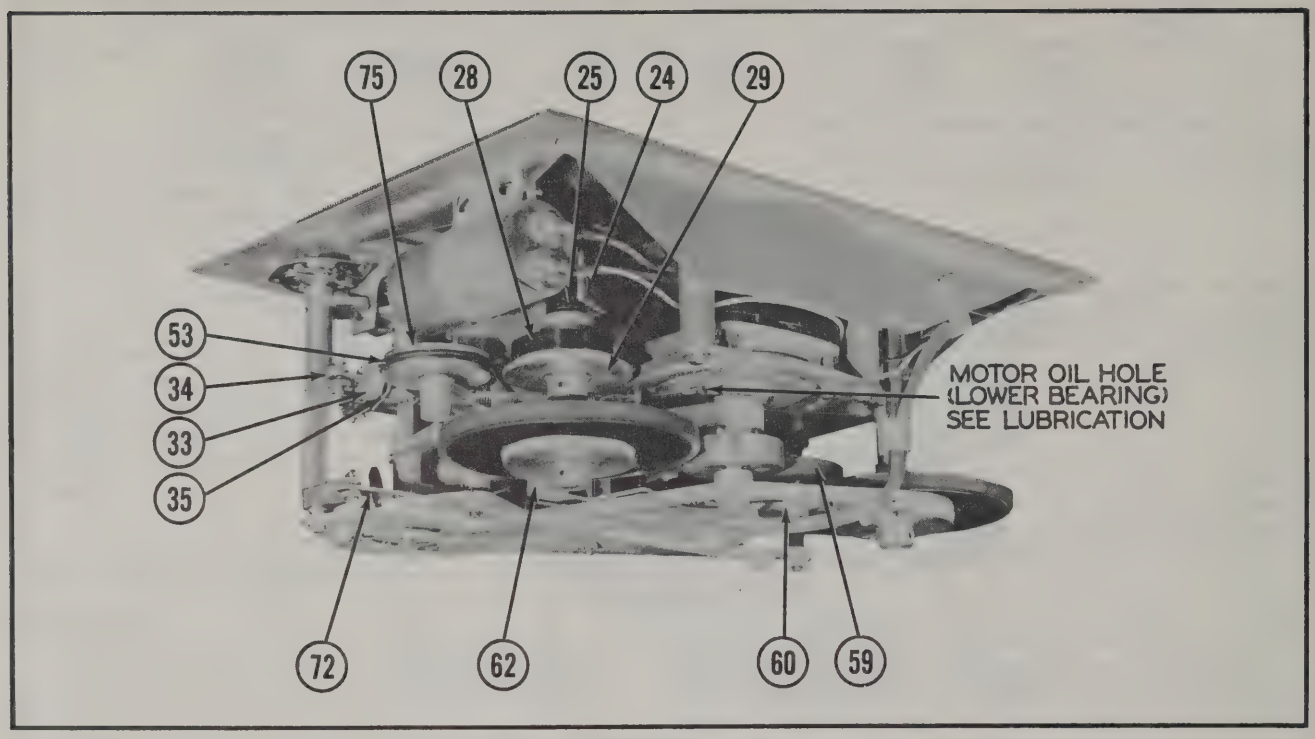


Figure 4

these accumulations may lead to tape slippage, flutter, and wow.

LUBRICATION

Lubrication- The following lubricants are recommended: (available as part of Model 600 maintenance kit Cat. No. 6329).

West of the Rockies — Cal Oil OC, Turbine #11
East of the Rockies — Gulfcrest A
Gulf Oil Co.

The upper and lower bearings of the drive motor should be lubricated approximately every 500 hours. The upper oil hole of the motor is accessible through a hole, on top of the unit, in the tape transport grille (See Figure 2). For access to the lower oil hole, located in the right side of the motor end bell, remove the tape transport from the case.

Four or five drops of one of the recommended lubricants is sufficient. Care should be taken to avoid over-oiling or spills. Any such excess should be wiped away with a solvent.

The capstan may require oiling about once for every four oilings of the drive motor. For access to the upper bearing, the capstan idler (4) must first be removed. Remove the rubber cap on the idler. Remove the hairpin retainer and lift the idler off its shaft, taking care not to lose the washers associated with it. The aluminum plug-button over the capstan shaft may now be pried off and the felt washer beneath it removed to expose the upper capstan bearing. Use as much of one of the recommended lubricants as the bearing will accept, wipe away any excess, and reassemble.

CAUTION: Do not oil the felt washer which serves only as a dust protector, and to keep oil from working its way up the capstan.

For access to the lower bearing, remove the tape transport from the case. The oil hole is located in the front of the capstan bearing housing. Use exactly four drops of oil — no more.

Do not oil any other parts of the tape transport mechanism. All other bearings and moving parts are lubricated for life. If, in the course of maintenance, it becomes necessary to disassemble and clean parts of the mechanism (other than bearings), it is suggested that pivot points and friction surfaces be given a very light coat of grease (Standard BRB #340 or equivalent) before reassembly.

MECHANICAL TROUBLE SHOOTING

Most of the difficulties encountered in the Model 600 tape transport mechanism will be traceable to contamination of belts, pulleys, bearings, and other friction surfaces, or to the accumulation of dirt or other foreign material to be expected over a reasonable length of time. Correction of these difficulties will usually be a matter of careful disassembly and cleaning, rather than readjustment of the mechanism. The normal torques (and hence, tape tension) in this mechanism are fixed within strict design specifications, and are not adjustable. Since the measurement of these torques will frequently provide a rapid means for isolating the source of troubles, their values and the procedures for measuring them are given below.

Torques And Tape Tension-

The measurement of torques on the Model 600 requires the following equipment:

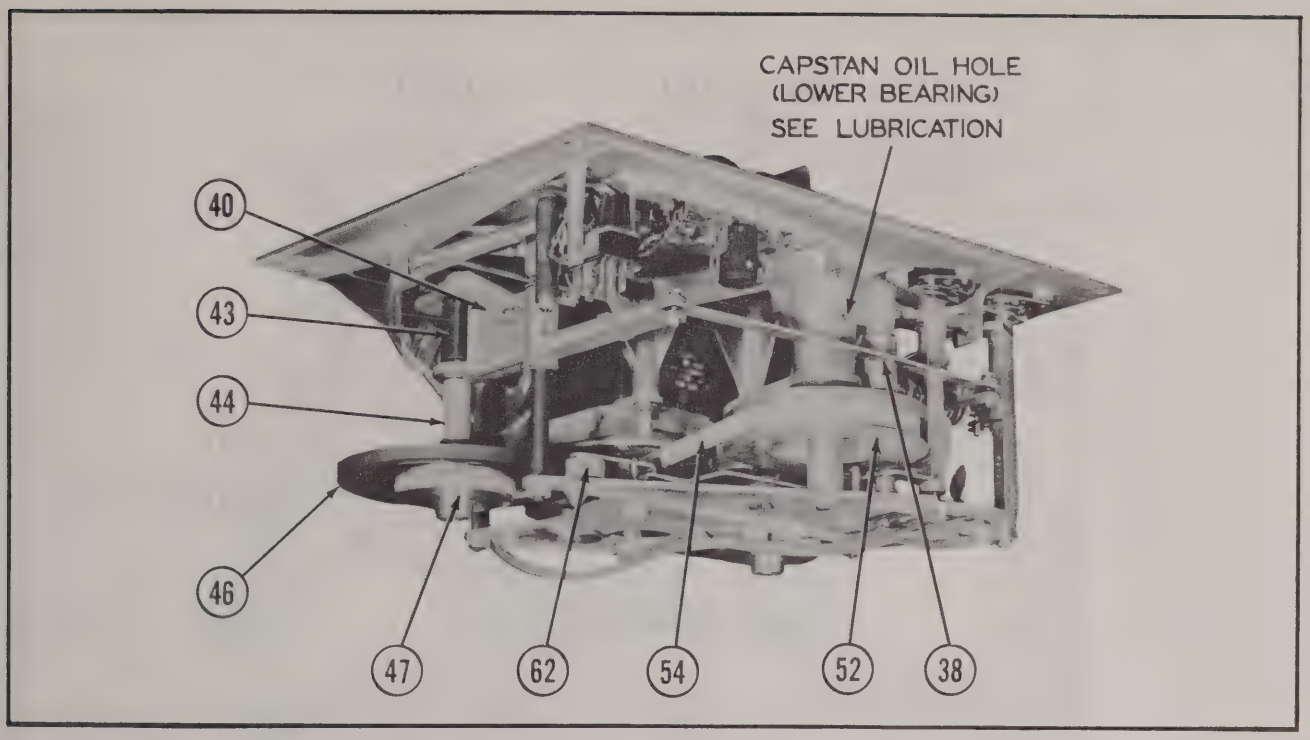


Figure 5

1. A light-movement spring scale (Post-A-Let 0-8 oz., Exact Weight Scale Co., Columbus, Ohio).

2. A measuring hub. A standard RTMA plastic reel may be used. If the hub diameter is exactly 2 inches, the spring scale will read directly in ounce/inches. Reels with smaller hubs can be brought up to 2-inch diameter by winding on sufficient tape. If a reel of greater than 2-inch hub diameter is used, multiply the spring scale by the hub radius to obtain the ounce/inch reading.

3. A piece of string, approximately 30 inches long, with a small loop tied at one end.

Torques measured on the driven turntable in any mode, (i.e. the turntable on which the tape is being wound) are a measure of takeup tension. Torques measured on the turntable from which the tape is pulled in any mode are a measure of holdback tension.

To measure takeup tension, place the measuring hub on the driven turntable. Wind a few turns around the hub in the direction of normal tape wrap, and attach the spring scale to the loop at the end. Start the machine in the appropriate mode and, as the string is wound on the hub, allow the scale to move in with it, taking the reading while the scale is in motion.

To measure holdback tension, place the measuring hub on the turntable from which the tape is pulled in the mode in question. Wind the string on fully in the direction of tape wrap, and attach the spring scale. Start the machine in the appropriate mode, and pull the scale slowly in the direction in which tape is normally pulled from this reel, taking the reading while the scale is in steady motion.

Normal torques are as follows:

Takeup

Fast Forward	5 to 7 oz./in.
Rewind	5 to 7 oz./in.
Play and Record	2 to 3 1/2 oz./in.

Holdback

Fast Forward	3/4 to 1 1/4 oz./in.
Rewind	3/4 to 1 1/4 oz./in.
Play and Record	5 3/4 to 8 3/4 oz./in.

Malfunctions In Play And Record-

Nearly all malfunctions in the record and playback modes will be reflected as flutter and wow in excess of specifications. A quick check of takeup and holdback tensions may lead directly to the source of trouble.

The word contaminated, as used here, may indicate either the presence of oil where it is not wanted, or accumulations of dirt or other foreign matter on pulleys and belts. In either case, carbon tetrachloride is recommended as the cleaning agent. After cleaning a contaminated part, clean any other part with which it normally comes into contact whether or not that part shows any immediate evidence of contamination.

1. Excessive or erratic holdback tension.

A. Contaminated rewind clutch felt (47).

B. Contaminated rewind clutch tire (46).

C. Rewind clutch spring (45) too stiff. This usually indicates tampering or carelessness in

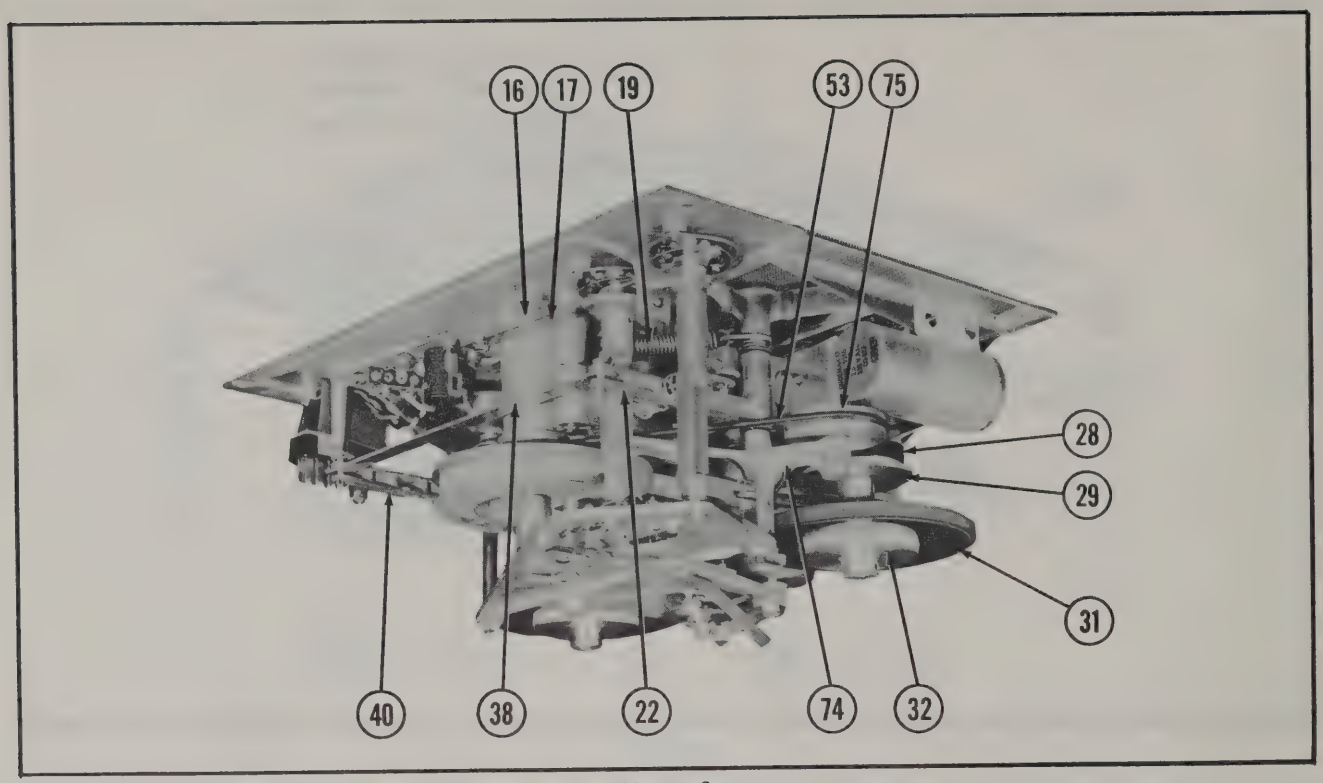


Figure 6

reassembly. It is advisable to replace the spring rather than to attempt makeshift readjustment.

2. Excessive Takeup Tension.

A. Contaminated play takeup clutch felt (32).

B. Oilite bearing (26) bottoming on aluminum clutch disc (29). Minimum clearance should be .015". (See "Turntable Height Adjustment" for adjustment procedure).

C. Takeup clutch spring (30) too stiff. It is advisable to replace the spring rather than attempt readjustment.

3. Drivemotor out of synchronism.

A. Line voltage below 105 volts AC.

B. Excessive play takeup tension. (See "2").

C. Nylon drive belt (54) tension excessive. (See "Drivemotor Centering").

D. Belt tensioning idler (37) dragging.

E. Drivemotor thrust misadjusted. (See "Drivemotor Thrust").

F. Defective drivemotor starting capacitor.

G. Dry bearings in drivemotor (55), capstan (51), or capstan idler (4). (See "Lubrication").

H. Defective drivemotor (55).

4. Flat or dented capstan idler tire.

A. If the capstan idler (4) is left engaged over an extended period of time when the machine is not operating, the idler tire may become dented. If running the machine in the play mode for several minutes doesn't restore the tire to normal, the idler must be replaced.

5. Defective or improperly installed nylon drive belt (54).

A. Belt spliced improperly.

B. Belt installed with splice joint toward pulley.

C. Belt worn due to misaligned motor pulley (57) causing it to track against one of the capstan pulley flanges (52).

6. Rewind idler (59) not disengaging from motor pulley (57).

A. Contaminated idler guide (60).

7. Reels misaligned with respect to tape guides.

A. This will usually cause tape scrape which may or may not be audible but will generally appear as flutter. (See "Turntable Height").

Malfunctions In "Rewind" Or "Fast Forward" Modes-

Rewind and fast forward malfunctions will usually be reflected as an apparent loss of power in those modes, loose tape wind, erratic tape motion or slippage, and, possibly no rewind or fast forward at all. Make a quick check of rewind or fast forward torques as described under "Torques And Tape Tension". The malfunctions discussed below apply to

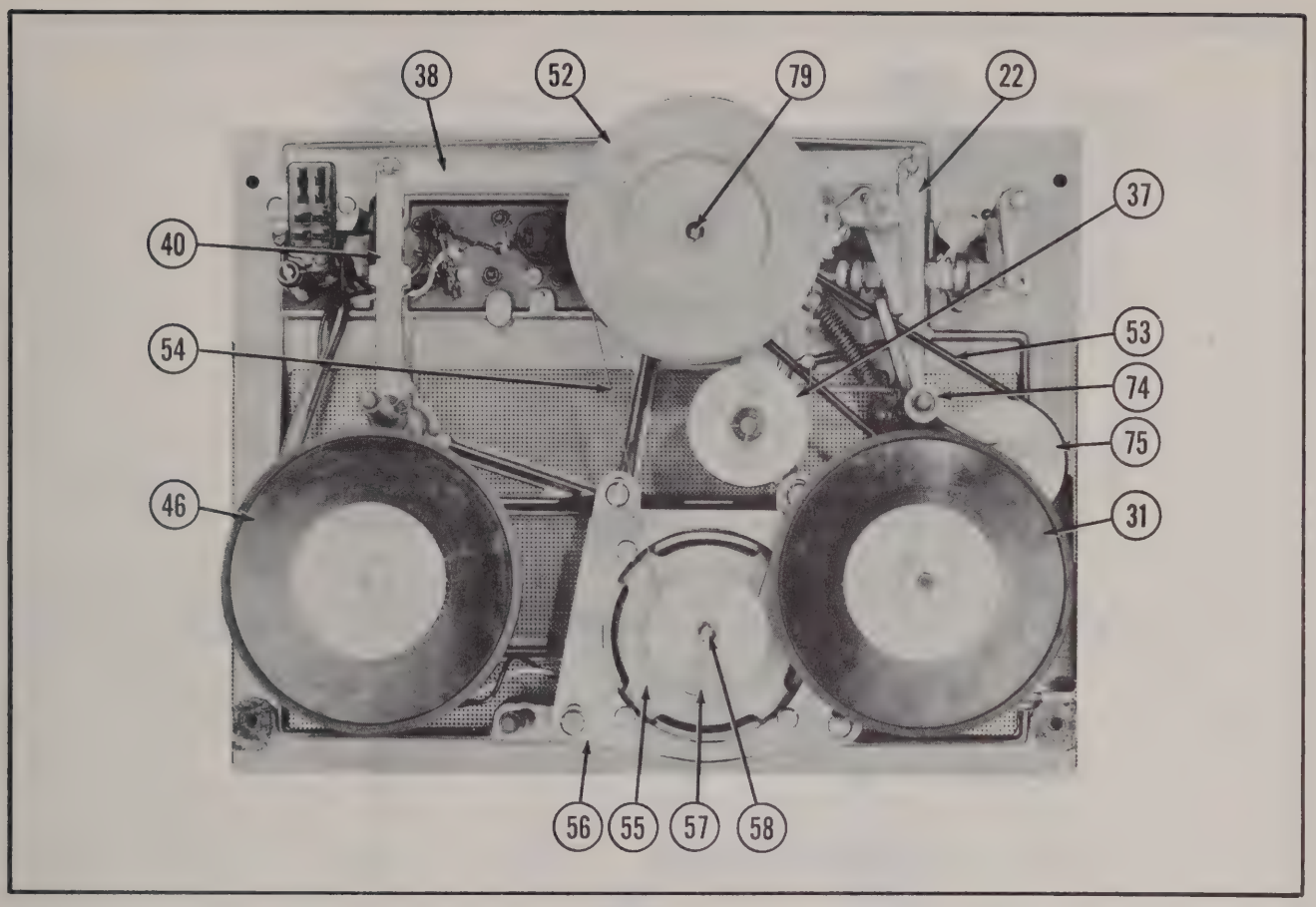


Figure 7

either mode, the turntables, associated components, and tape directions being opposite of each other.

1. Takeup tension low.

A. Clutch leaf spring (30 or 45) too weak. Usually caused by tampering. Replace. Never attempt to increase rewind or takeup tension to offset other problems.

2. Excessive holdback tension.

A. Contaminated holdback wipes (24 or 42).

B. Bakelite drum (25 or 43) on which wipe operates has been roughened.

3. Brake shock relief roller assembly (62) not releasing from fast forward clutch (31).

A. Evidence of bent or misassembled parts. (Check "Exploded View").

4. Contaminated clutch tire (31 or 46).

5. Rewind idler (59) not engaging motor pulley (57).

A. Bind in idler guide (60) due to contamination.

6. Malfunctioning turntable pivots (22 or 40).

A. Bind in turntable centering detent (77).

7. Bind in rewind idler bearing (59).

Starting, Stopping And Shuttling Malfunctions-

Starting, stopping, and shuttling malfunctions will be reflected in the throwing of tape loops and, in extreme cases, by tape breakage. These troubles are usually associated with low takeup tension or brake malfunctions produced primarily by tampering or misassembly, or contamination due to careless oiling or accumulation of dirt.

1. Tape loop thrown on starting in play mode. (Low play takeup tension).

A. Play takeup belt (53) contaminated.

B. Nylon drive belt (54) contaminated. If either the play takeup belt (53) or the nylon drive belt (54) are contaminated with oil, an overoiled motor or capstan is indicated. Clean all affected parts thoroughly with carbon tetrachloride.

C. Slippage between play takeup belt (53) and clutch (28) due either to weak play takeup arm spring (73) or bind in play takeup pulley bearing (75).

D. Bind in turntable shaft bearings (23 or 41) due to contamination. Clean and lubricate with two or three drops of medium weight oil.

E. Play takeup brake release (69) inoperative due to bind, weak or unattached spring (70)

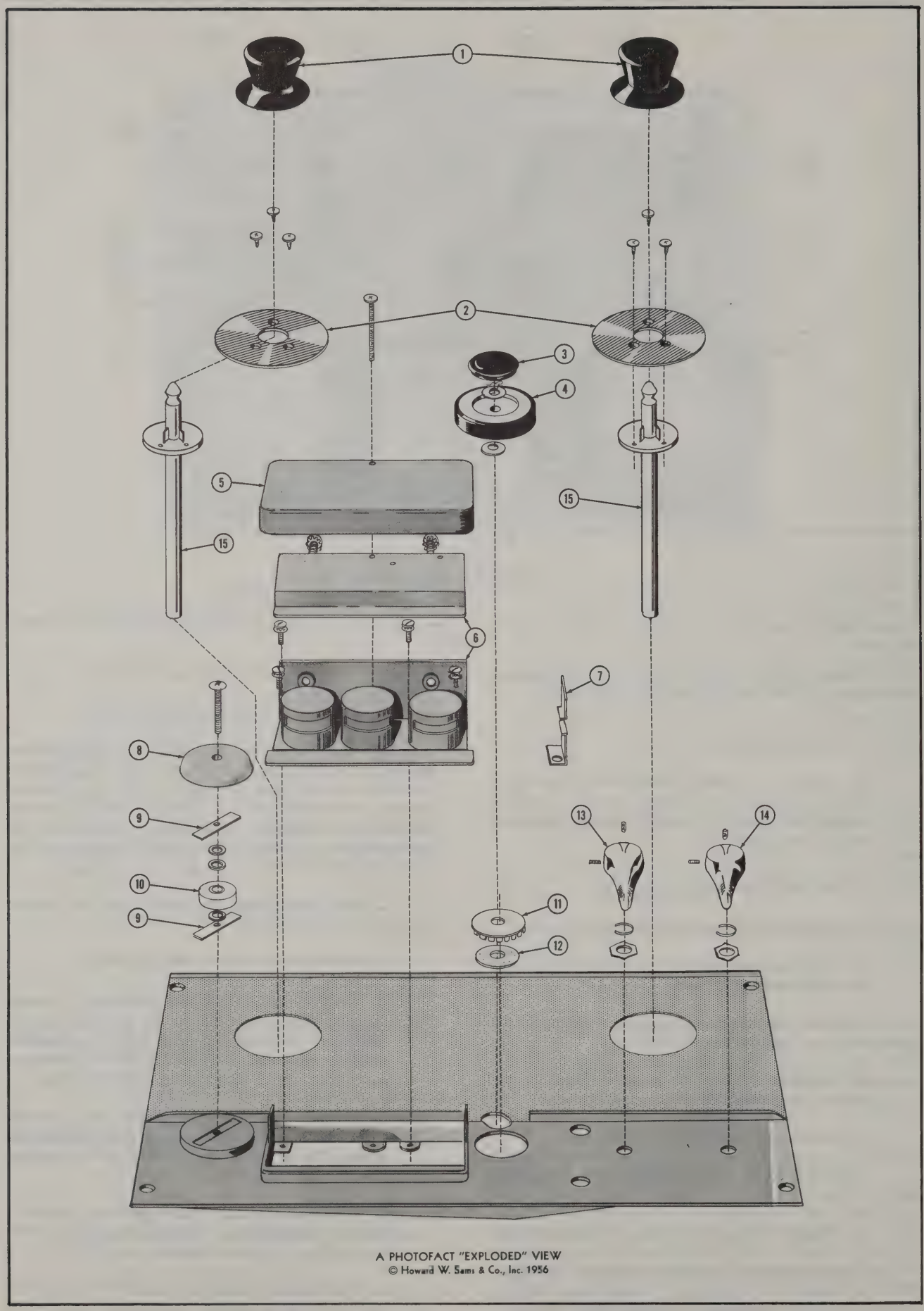


Figure 8A. Exploded View Of Parts Above Baseplate.

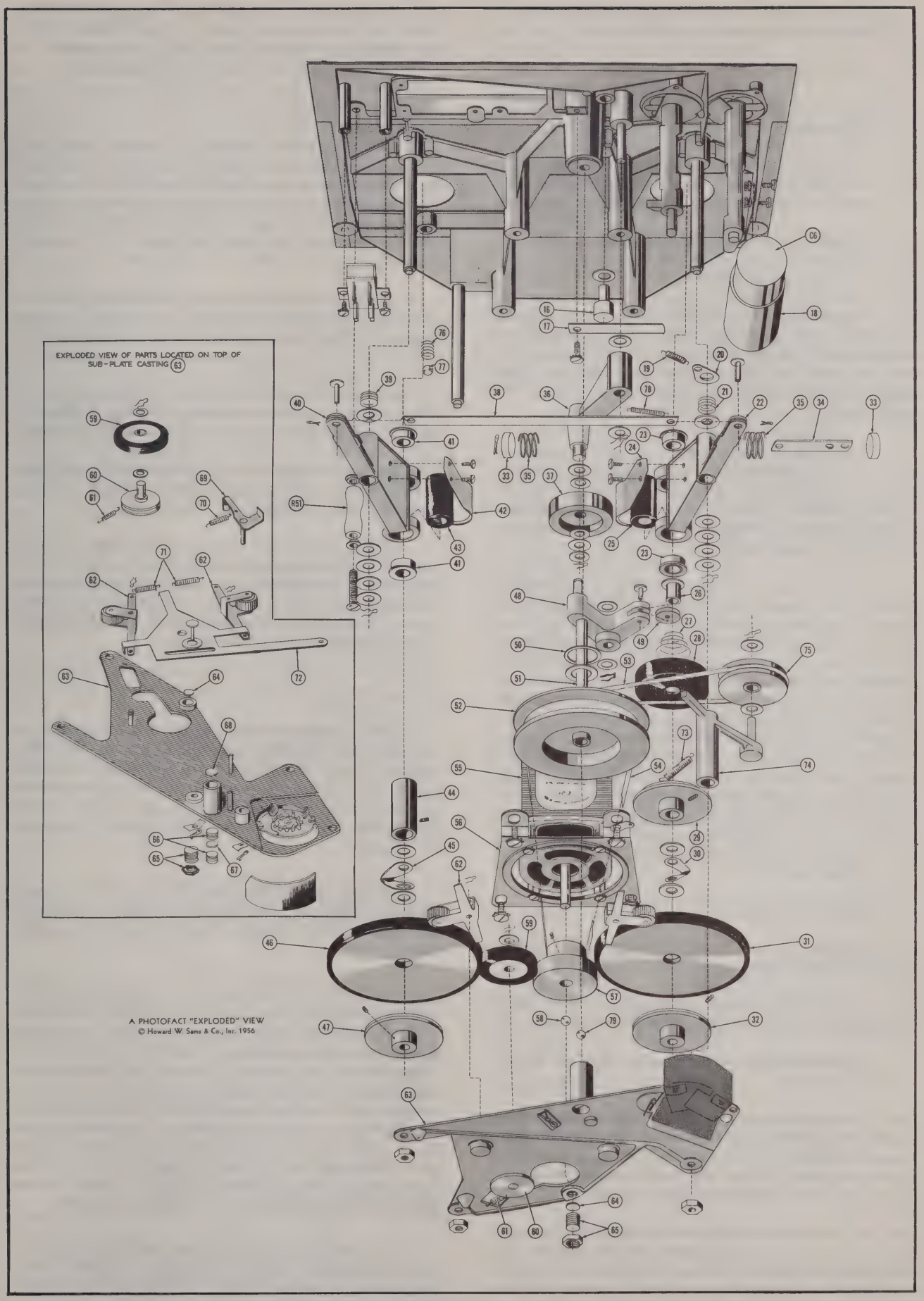


Figure 8B. Exploded View Of Parts Below Baseplate.

causing shock relief roller assembly (62) to drag on fast forward clutch tire (31).

2. Tape loop thrown on stopping or shuttling.

A. One or both brake shock relief assemblies (62) binding.

B. One or both brake shock relief springs (71) off. End loops on these springs must be fully closed to prevent their becoming disconnected.

C. Bind in turntable centering detent (77).

ADJUSTMENTS

The following section covers adjustment, critical clearances, and alignment which must be maintained is reassembling parts of the tape transport mechanism that may have been disassembled for servicing. Two general precautions should be observed in any required disassembly:

1. Always note the number, type and location of washers in an assembly very carefully. Should washers, retainers or other small hardware be lost or damaged in servicing, a kit containing an assortment of such hardware (Ampex Cat. No. 6392) is available through any Ampex dealer.

2. To remove the sub-plate (63), a preliminary to any further disassembly of parts under the top plate casting, remove only the three elastic stop-nuts that hold it, and the clevis pin that links the slide lever (72) to the lower yoke of the rewind-fast forward actuator. It is unnecessary to remove the adjustment screws (65 and 66) for the capstan thrust and the motor thrust. If the settings of these screws are changed, they must be carefully readjusted as described in the following sub-sections. The thrust discs (64 and 67) beneath these screws, being coated with grease, will usually stay in place when the sub-plate is removed. It is advisable, however, to be sure that they don't fall out. It will be easier to reinstall the sub-plate, after servicing, if the Play-Record control is placed in the "Play" position.

Drivemotor Centering-

To center the drivemotor properly on replacing it, proceed as follows:

1. Mount the motor assembly in place, but do not tighten the motor mounting plate screws securely.

2. Mount the sub-plate assembly (63), and secure it firmly in place.

3. Position the drivemotor so that when the Play-Record and Rewind-Fast Forward controls are in their neutral positions, there is 1/16" clearance between the motor pulley (57) and the fast forward clutch (31). Secure the motor mounting plate screws.

4. Position the nylon drive belt (54) on the motor pulley (57). Hold the belt tensioning idler pulley (37) off the belt, and turn the capstan flywheel (52) by hand. If the motor is correctly positioned, the belt will slip on the motor pulley. Release the idler, turn the capstan flywheel, and the motor pulley should rotate. Should the motor pulley rotate without slippage when the tensioning idler is held back, belt tension is excessive, and the motor must be re-positioned.

Drivemotor Thrust-

The drivemotor thrust is a hardened steel ball (58) against a nylon disc (64). End thrust is adjusted by a set-screw locknut combination (65). The thrust must be adjusted to eliminate all end-play, and pre-load the motor very lightly. Assuming that the motor has been centered as described under "Drivemotor Centering", the procedure is as follows:

1. Coat the thrust disc (64) liberally with grease (Standard BRB #340 or equivalent) and drop it through the threaded hole in sub-plate (63) under motor pulley (57).

2. Insert the set screw (65). Grasp the motor pulley (57) between the thumb and index fingers and work it up and down to get the "feel" of the end play.

3. Slowly tighten the set screw until end play can no longer be felt; then tighten the screw an additional 1/8-turn, and lock it.

If the adjustment is incorrectly made, and end play still exists, a growling sound may be heard when the machine is operating --- particularly in the vertical position. If the adjustment screw is set too tightly, it may load the motor heavily enough to cause it to fail to drop into synchronism.

Capstan Thrust-

The capstan thrust, like the motor thrust, is a hardened steel ball (79) against a nylon disc (68). The capstan thrust is adjusted by a set-screw (66) and locked by a second set-screw (66) which bottoms on an anti-turn disc (67) placed atop the adjustment screw. End play of .010" to .015" is required, and is obtained as follows:

1. Coat the nylon disc liberally with grease (Standard BRB #340 or equivalent) and drop it through the threaded hole in the sub-plate (63) under the capstan shaft.

2. Insert the first set-screw, and tighten down until it is felt to bottom on the thrust disc. Grasp the capstan flywheel (52) between the thumb and index finger. While maintaining a slight pressure on the head of the set-screw with a screwdriver (to simulate the pressure that will later be applied by the locking screw) start backing the screw off slowly, and work the capstan flywheel up and down until an audible click at the ends of its travel indicates the presence of end play. This will usually occur when the set-screw has been backed off approximately 1/4 of a turn. At this point, end play should be in the required range.

3. Drop the anti-turn disc (dimple facing the locking screw) on top of the adjustment screw. Insert the locking screw and tighten it down until it bottoms firmly on the anti-turn disc.

Turntable Height-

Turntable height (the distance measured from the top surface of the turntable (2) to the perforated metal grille) should be .125" ±.008". This height is determined by the placement of lamicoid washers between the bottom of the turntable pivot (22 or 40) and the hairpin retainer on the shaft through the pivot. Difficulties with tape tracking that are traced to improper turntable height may be corrected by increasing or decreasing the number or thickness of these washers.

Play Takeup Clutch-

The play takeup clutch assembly consists of a felt-lined aluminum disc (29), and a bakelite clutch (28) which is spring-loaded to the disc. When the machine is in the play mode, the clutch is driven by the rubber belt (53) on the play takeup pulley (75). Location of the felt-lined aluminum disc is critical, a clearance of .015" being required between the end of the oilite bearing (26), which goes through the bakelite clutch (28), and the bottom of the aluminum disc (29). This clearance, which cannot be measured directly with a gauge because of the physical setup, can be set quite accurately by the following indirect method:

1. Insert a removable .015" shim or feeler gauge between the thrust washer that rides on the inner race of the lower ball bearing (23) of the takeup turntable pivot (22) and the oilite bushing (26).

2. Assemble the conical spring (27), the bakelite clutch (28), and the felt-lined aluminum disc (29) (in that order) on the turntable shaft (15).

3. Guide the end of the oilite bushing through the hole in the center of the bakelite clutch, and press the aluminum disc down until it bottoms firmly on the end of the bushing.

4. Holding the disc in place, tighten the set screw in its hub.

5. Remove the shim or gauge. The expansion of the conical spring will then force the oilite bushing back off the aluminum disc, thus creating the required .015" clearance.

Rewind And Fast Forward Clutch Alignment-

The rubber-tired bakelite rewind (46) and fast forward clutch (31) must line up with the shock relief brake assemblies (62) so that the rollers engage the full width of the tires. In addition, the rewind clutch (46) should be aligned for full-width contact with the rewind idler (59), and the fast forward clutch (31) for full width contact with the motor pulley (57).

OVERALL PERFORMANCE CHECKS

Ampex recorders are correctly aligned and adjusted at the factory just before shipment, and will meet specifications given previously provided no shipping damage has occured. Whenever there is any doubt concerning the performance of the Model 600, these overall performance checks should be made as a preliminary to making any necessary readjustments.

The following is a list of definitions of output levels referred to in performance checking and alignment procedures on the Model 600.

Normal Operating Level-

Approximately 1.25 Volts RMS into 10,000 ohms. This is the point at which the maximum total harmonic distortion is 1% at 400 cycles.

Peak Recording Level-

The 3% distortion point per NARTB standards. The level at which 3% distortion occurs may vary considerably, depending on the characteristics of the tape used. For the purposes described herein, Peak Recording Level is defined as 6db above Normal Operating Level.

Standard Tape Level-

10db below Normal Operating Level. Ampex Alignment Tapes are recorded at this level.

Overall Frequency Response Measurement-

Due to the nature of the pre-emphasis in the record amplifier, tape saturation will occur at high frequencies unless the response check is made 20db below Normal Operating Level.

The procedure is as follows:

1. Thread a tape on the machine.

2. Connect an audio oscillator to Line Input and set the oscillator to 1,000 cps.

3. Terminate the Output in a 10,000 ohm resistor and connect a sensitive A.C. VTVM across this load.

4. Turn the machine on. Turn the Monitor Selector to "Input", and adjust the Line Rec. Level control for a VTVM reading 20db below Normal Operating Level. (i.e., approximately 0.13 Volts RMS).

5. Turn the Monitor Selector to "Tape" and start the machine in the record mode.

6. Sweep the oscillator slowly through the specified range and observe the response on the VTVM. If the response fails to meet specifications, check the output of the oscillator over the range before attempting the alignment procedures given under "Electronic Assembly".

Overall Noise Measurement-

The procedure for measuring overall wide band noise is derived from the NARTB signal-to-noise definition, given under "Specifications".

1. Thread a tape on the machine.

2. Connect an audio oscillator to Line Input and set the oscillator to 400 cps.

3. Terminate the Output in a 10,000 ohm resistor and connect a sensitive VTVM across this load.

4. Turn the machine on. Turn the Monitor Selector to "Input", and adjust the Line Rec. Level control for a VTVM reading 6db above Normal Operating Level. (i.e., approximately 2.5 Volts RMS).

5. Start the machine in the "Record" mode, and record a substantial length of tape.

6. Rewind the tape. Disconnect the oscillator. Turn the Line Rec. Level and Mic. Rec. Level controls to zero.

7. Put the machine in the "Record" mode, thus erasing the previously recorded signal, then rewind the tape.

8. Turn the Monitor Selector to "Tape", and start the machine in the "Play" mode. The noise signal read on the VTVM (for full track machines) should not be greater than .004 Volts RMS (i.e., fully 55db below Peak Recording Level.)

Overall Distortion-

Overall distortion can be measured by connecting any standard distortion measurement apparatus having an input impedance of 10,000 ohms or greater across the "Output" (terminated in 10,000 ohms) and recording a 500 cycle signal from an audio oscillator at either Normal Operating Level or Peak Recording Level. Readings from a wave analyzer or selective frequency distortion meter will be more accurate at low distortion levels than those from a null type instrument. Fundamental null type meters measure noise as well as distortion. Noise should therefore be checked before making distortion measurements with this type of instrument.

Distortion readings may vary with the type of tape used. Overall distortion should not exceed 1% at Normal Operating Level and 3% at Peak Recording Level. (It is advisable to check the distortion in the output of the oscillator used for measurement. A reading of .2% or .3% is satisfactory.)

Flutter And Wow-

Flutter and Wow are produced by periodic irregularities in tape speed, and appear as cyclic frequency deviations in recording or reproducing. They can be measured by means of any standard flutter bridge connected across the correctly terminated machine output. Flutter at 7 1/2 ips tape speed on the Model 600 should not exceed 0.25%.

NOTE: Slow amplitude variations in output level may be noted in the course of measurement. These are entirely due to tape coating variations and do not constitute flutter.

ELECTRONIC ALIGNMENT

Electronic alignment consists of making all adjustments necessary for proper electronic performance. A recorder "out of alignment" may be characterized by poor frequency response, high noise, low output, high distortion, or a combination of these faults.

To set up for alignment, remove the four screws that hold the amplifier in the case. Stand the case up, and pull the amplifier forward. The interconnecting cables between the amplifier and tape transport mechanism are long enough to permit access to all adjustments on the electronic assembly with the two units connected.

Alignment And Test Equipment Requirements-

The following list covers the minimum equipment requirements for proper alignment and testing.

1. Audio oscillator.

2. Vacuum Tube Voltmeter.

3. Ampex alignment tape. Catalog No. 5563 for all 7 1/2 ips machines made by Ampex. This tape is recorded at 7 1/2 ips, 10db below normal operating level. The tape contains voice announcements of the following tone sequence: playback head alignment tone, reference tone for playback level adjustment, tone series for playback response check.

4. Ampex head demagnetizer — Catalog No. 704.

5. High impedance headphones.

6. Small screwdriver.

Head Demagnetization-

It is always advisable to demagnetize the record and playback heads as a preliminary to aligning the machine. (The erase head requires no demagnetization). Magnetized heads will generally produce an increase of 5 to 10db in noise level, distortion of the recorded signal, and will gradually erase the high frequencies on any tape passed over them. Demagnetization procedure is as follows:

1. Remove both the head cover and the mu metal shield over the head assembly.

2. Turn the power switch of the machine off. Plug the demagnetizer into any source of 117-volt AC power.

3. The heads, from left to right when facing the machine, are: Erase Head, Record Head, Playback Head. Bring the tips of the demagnetizer as close as possible to, but preferably not into contact with the Record Head stack. (Tips should straddle the gap in the center of the stack.) Run the tips slowly up and down the stack several times, and then withdraw the demagnetizer very slowly. This slow withdrawal is required if thorough demagnetization is to be achieved.

4. Repeat step 3 on the Playback Head. It is unnecessary to demagnetize the Erase Head.

5. Replace the head shield, but do not replace the head cover if complete alignment, including head azimuth adjustment, is to be undertaken.

Playback Channel Alignment-

1. Playback Head Azimuth Adjustment:

A. Thread the alignment tape on the machine. Terminate the output in 10,000 ohms, and con-

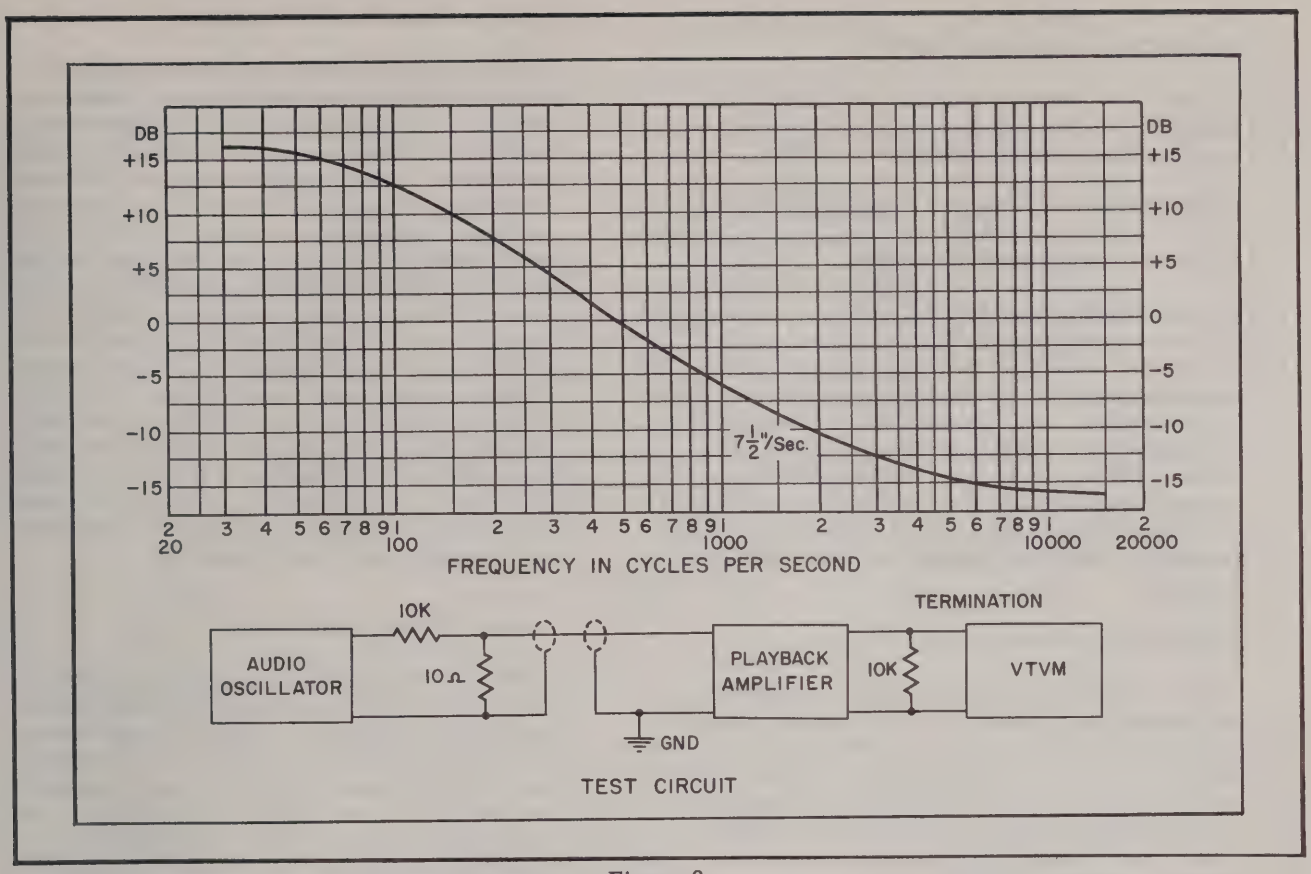


Figure 9

nect a VTVM across this load. Plug in a pair of high impedance headphones so that voice announcements on the tape may be heard. Remove the head assembly cover, but not the mu metal shield beneath it. Turn the Monitor Selector to "Tape", and start the machine in the playback mode. The head alignment tone will be the first one announced.

B. Insert a small screwdriver through the access hole nearest the right hand edge of the head shield, and adjust the azimuth screw for maximum output as seen on the VTVM. If the head is very far out of alignment, several of the minor peaks which occur on either side of the maximum may be observed. The maximum, however, is clearly 15 to 20db greater than any of these.

2. Playback Level Setting:

A. The next tone on the tape is for playback level setting. Adjust the playback level control (R39) for a VTVM reading 10db below Normal Operating Level, (i.e., approximately 0.4 Volts RMS).

3. Playback Response Check:

A. The next series of tones is for playback response checking. Observe the response indicated on the VTVM, and check it against "Specifications". If playback response fails to meet specifications, the trouble may be a worn or otherwise faulty playback head, a partially erased alignment tape (due to head magnetization), or improper equalization of the playback amplifier. Equalization may be checked and adjusted as indicated in the following step.

4. Playback Equalization:

A. Playback equalization is a bench procedure. The required test set-up and the playback amplifier response curve are given in Fig. 9. Set the oscillator at 500 cycles, and adjust its output for a VTVM reading 10db below Normal Operating Level (approximately 0.4 Volts RMS) to establish a reference. Increase the oscillator frequency to 8000 cycles and adjust the Playback Equal. Adj. (R4) to set playback response on curve at that point. Sweep the oscillator through the specified frequency range. Response should follow that curve within ±1/2db. Be sure that the oscillator output remains constant over this range.

5. Hum Balance Adjustment:

A. After completing Steps 1 through 4 as necessary adjust the Hum Balance Control (R7) for minimum hum as seen on a VTVM connected across the Output. (Monitor Selector should be on "Tape").

Record Channel Alignment-

1. Bias Adjustment:

A. Thread a tape on the machine. Terminate the output in 10,000 ohms and connect a VTVM across this load. Connect an audio oscillator

set to 500 cycles to the Line Input, and start the machine in the record mode.

B. Turn the Monitor Selector to "Tape", and adjust the Line Record Level control for a Normal Operating Level reading on the VTVM.

C. Adjust the Bias trimmer to peak this output.

2. Record Level Meter Calibration:

A. After peaking the bias as described in Step 1-C above, and with the Monitor Selector set on "Tape," readjust the Line Record Level control to bring the VTVM reading back to Normal Operating Level. Turn the Monitor Selector to "Tape" and adjust the Record Calibration control (R3) to bring the VTVM reading to Normal Operating Level. The VU meter is now calibrated, and should read zero VU ±1/2db with the Monitor Selector in either the Input or Tape position.

3. Record Head Azimuth Adjustment:

A. Thread a tape on the machine. Terminate the output in 10,000 ohms and connect a VTVM across this load. Connect an audio oscillator set at 250 cps to the Line Input. Turn the Monitor Selector to "Tape", start the machine in the record mode, and adjust the Line Rec. Level control for a VTVM reading 20db below Normal Operating Level.

B. Increase the oscillator setting to 10,000 cycles. Insert a small screwdriver through the access hole nearest to the center of the head shield and adjust the Record Head Azimuth screw for maximum output.

4. Record Equalization Adjustment:

A. Record equalization can be accomplished without disconnecting the Electronic Assembly from the Mechanical Assembly provided that the Playback Channel is properly aligned and that the Record Head is in good condition. If these conditions are satisfied, thread a tape on the machine. Terminate the output in 10,000 ohms and connect a VTVM across this load. Set an audio oscillator to 250 cycles and connect it to the Line Input. Turn the Monitor Selector to "Tape", and start the machine in the record mode. Adjust the Line Rec. Level control for a VTVM reading 20db below Normal Operating Level. Increase the oscillator setting to 8,000 cps and adjust the Record Equalization Adj. (C11) for a VTVM reading 20db below Normal Operating Level. Frequency response can now be checked by sweeping the oscillator through the range given in "Specifications".

5. Noise Balance Adjustment:

A. Thread a tape on the machine. Connect a 0.1 Mfd. capacitor and a sensitive VTVM across the output, and plug in a pair of headphones. Disconnect all inputs, turn Line Rec. Level and Mic. Record Level controls to zero, and start the machine in the record mode. Adjust the Noise Balance Adjustment control (R6) for a minimum reading on the VTVM or minimum "popping" noise in the headphones.

6. Final Bias Adjustment:

A. Before reassembling the machine, re-check the bias adjustment discussed in Step 1.

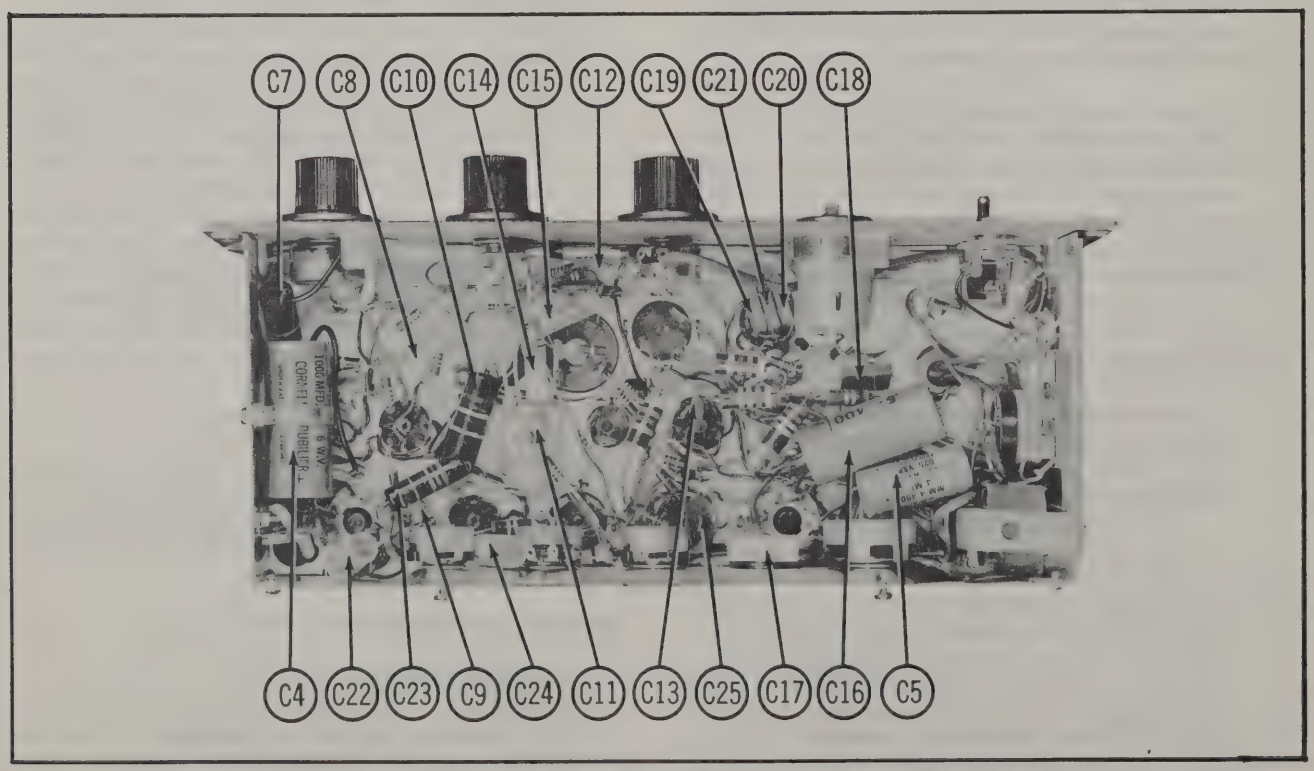
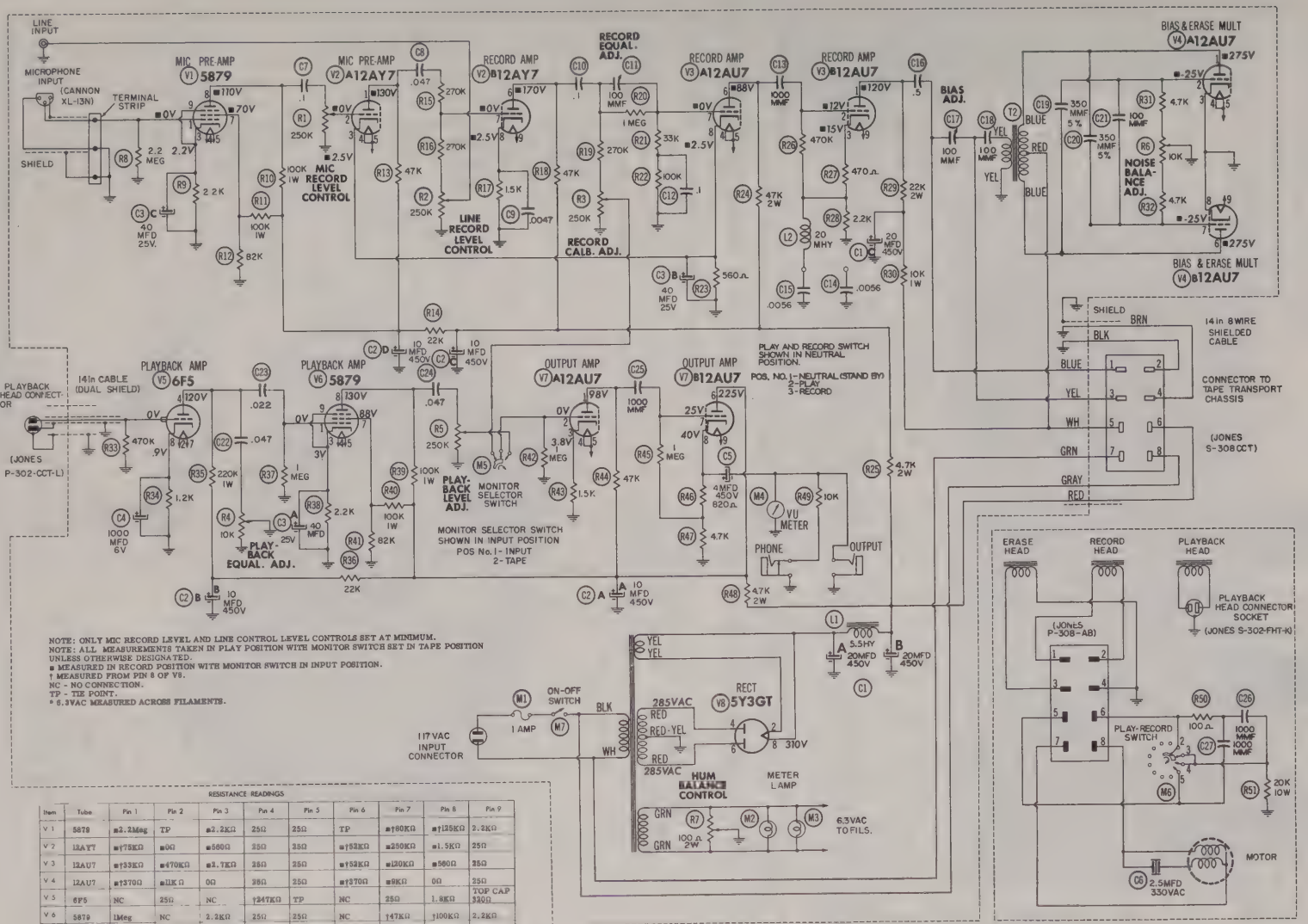


FIGURE 10. BOTTOM VIEW OF AMPLIFIER SHOWING CAPACITOR LOCATIONS.



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	5879	■2.2Meg	TP	■2.2KΩ	25Ω	25Ω	TP	■†80KΩ	■†125KΩ	2.2KΩ
V 2	12AY7	■†75KΩ	■0Ω	■560Ω	25Ω	25Ω	■†52KΩ	■250KΩ	■1.5KΩ	25Ω
V 3	12AU7	■†33KΩ	■470KΩ	■2.7KΩ	25Ω	25Ω	■†52KΩ	■120KΩ	■560Ω	25Ω
V 4	12AU7	■†370Ω	■11KΩ	0Ω	25Ω	25Ω	■†370Ω	■9KΩ	0Ω	25Ω
V 5	6F5	NC	25Ω	NC	†247KΩ	TP	NC	25Ω	1.8KΩ	TOP CAP 320Ω
V 6	5879	1Meg	NC	2.2KΩ	25Ω	25Ω	NC	†47KΩ	†100KΩ	2.2KΩ
V 7	12AU7	†47KΩ	1.5KΩ	70KΩ	25Ω	25Ω	†4.7KΩ	1Meg	5.5KΩ	25Ω
V 8	5Y3	NC	17KΩ	NC	420Ω	NC	400Ω	NC	17KΩ	

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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312-2

MODEL 600 SCHEMATIC

AMPEX
MODEL 600

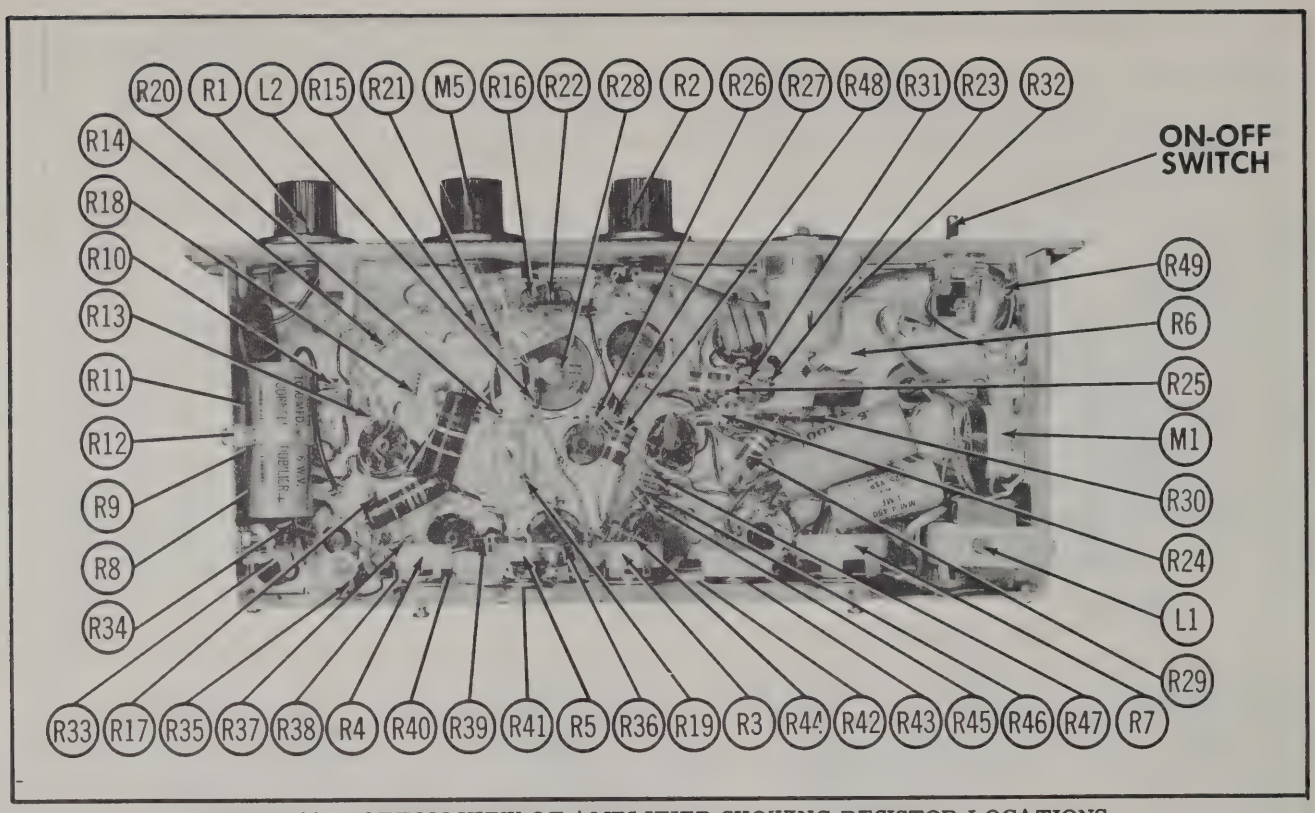


FIGURE 11. BOTTOM VIEW OF AMPLIFIER SHOWING RESISTOR LOCATIONS.

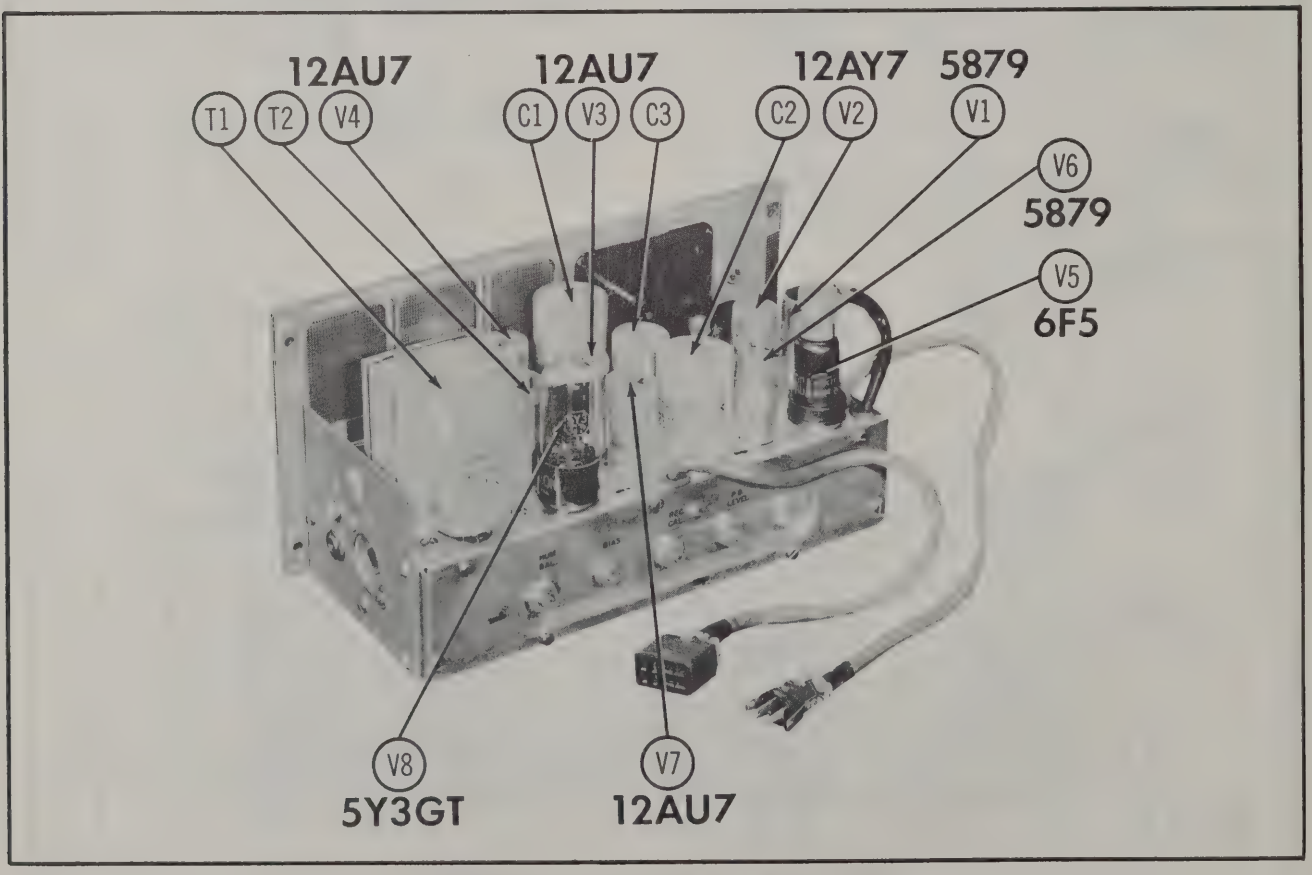


FIGURE 12. TOP VIEW OF AMPLIFIER.

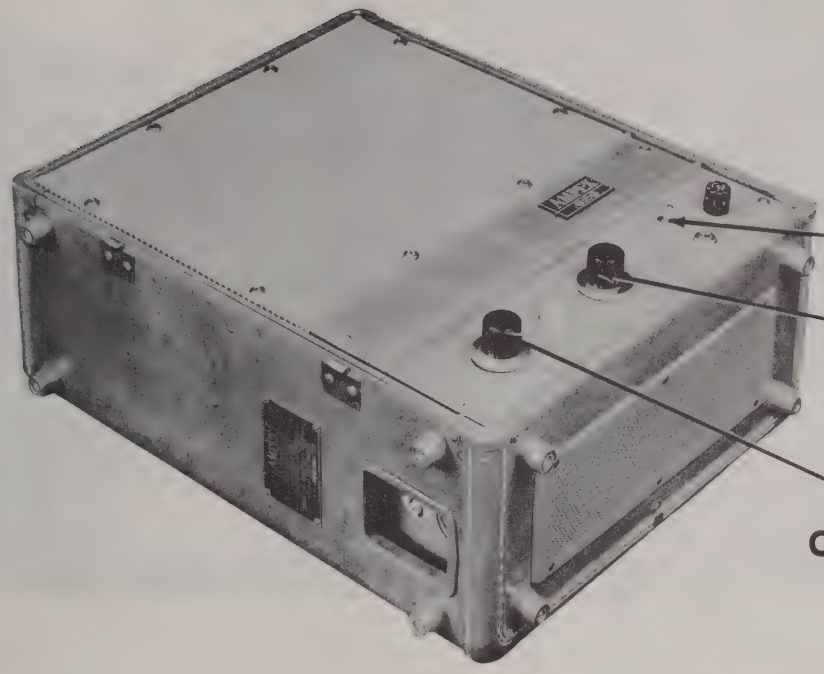
Ref. No.	Part No.	Description
V1	TU-35	5879 Mic Pre-Amp.
V2	TU-63	12AY7 Mic Pre-Amp. - Record Amp.
V3	TU-28	12AU7 Record Amp.
V4	TU-28	12AU7 Bias And Erase Osc.
V5	TU-62	6F5 Playback Amp.
V6	TU-35	5879 Playback Amp.
V7	TU-28	12AU7 Output Amp.
V8	TU-14	5Y3GT Rectifier
C1A	CO-236	Elect. Cap., 20MFD. @ 450V.
C1B		Elect. Cap., 20MFD. @ 450V.
C1C		Elect. Cap., 20MFD. @ 450V.
C2A	CO-68	Elect. Cap., 10MFD. @ 450V.
C2B		Elect. Cap., 10MFD. @ 450V.
C2C		Elect. Cap., 10MFD. @ 450V.
C2D		Elect. Cap., 10MFD. @ 450V.
C3A	CO-328	Elect. Cap., 40MFD. @ 25V.
C3B		Elect. Cap., 40MFD. @ 25V.
C3C		Elect. Cap., 40MFD. @ 25V.
C4	CO-329	Elect. Cap., 1000MFD. @ 6V.
C5	CO-53	Elect. Cap., 4MFD. @ 450V.
*C6	CO-327	Elect. Cap., 2.5MFD. @ 220V.
C7	CO-294	Cap. Molded Paper, .1MFD. @ 400V.
C8	CO-347	Cap. Molded Paper, .047MFD. @ 400V.
C9	CO-334	Cap. Molded Paper, .0047MFD. @ 400V.
C10	CO-294	Cap. Molded Paper, .01MFD. @ 400V.
C11	CO-92	Cap. Trimmer, 100MMF.
C12	CO-335	Cap. Molded Paper, .1MFD. @ 200V.
C13	CO-338	Cap. Ceramic, 1000MMF. @ 500V.
C14	CO-349	Cap. Molded Paper, .0056MFD. @ 400V.
C15	CO-349	Cap. Molded Paper, .0056MFD. @ 400V.
C16	CO-330	Cap. Molded Paper, .5MFD. @400V.
C17	CO-92	Cap. Trimmer, 100MMF.
C18	CO-6	Cap. Mica, 100MMF. @ 500V.
C19	CO-140	Cap. Mica, 350MMF. @ 500V.
C20	CO-140	Cap. Mica, 350MMF. @ 500V.
C21	CO-6	Cap. Mica, 100MMF. @ 500V.
C22	CO-333	Cap. Molded Paper, .047MFD. @ 400V.
C23		Cap. Molded Paper, .022MFD.
C24	CO-333	Cap. Molded Paper, .047MFD. @ 400V.
C25	CO-338	Cap. Ceramic 1000MMF. @ 500V.
*C26	CO-338	Cap. Ceramic 1000MMF. @ 500V.
*C27	CO-338	Cap. Ceramic 1000MMF. @ 500V.
R1	RE-614	Mic. Record Level Control, 250K, 1/2W.
R2	RE-614	Line Record Level Control, 250K, 1/2W.
R3	RE-229	Record Calb. Adj., 250K, 1/2W.
R4	RE-616	Playback Equal. Adj., 10K, 1/2W.
R5	RE-229	Playback Level Adj., 250K, 1/2W.
R6	RE-617	Noise Balance Adj., 10K, 1/2W.
R7	RE-618	Hum Balance Control, 100Ω, 2W.
R8	RE-434	Resistor, 2.2Meg., 1/2W.
R9	RE-369	Resistor, 2.2K, 1/2W.
R10	RE-26	Resistor, 100K, 1W.
R11	RE-26	Resistor, 100K, 1W.
R12	RE-455	Resistor, 82K, 1/2W.
R13	RE-299	Resistor, 47K, 1/2W.
R14	RE-298	Resistor, 22K, 1/2W.
R15	RE-297	Resistor, 270K, 1/2W.
R16	RE-297	Resistor, 270K, 1/2W.
R17	RE-619	Resistor, 1.5K, 1/2W. 5%
R18	RE-299	Resistor, 47K, 1/2W.
R19	RE-297	Resistor, 270K, 1/2W.
R20	RE-290	Resistor, 1Meg., 1/2W.
R21	RE-620	Resistor, 33K, 1/2W. 5%
R22	RE-300	Resistor, 100K, 1/2W.
R23	RE-446	Resistor, 560Ω, 1/2W.
R24	RE-175	Resistor, 47K, 2W.
R25	RE-164	Resistor, 4.7K, 2W.
R26	RE-302	Resistor, 470K, 1/2W.
R27	RE-333	Resistor, 470Ω, 1/2W.
R28	RE-369	Resistor, 2.2K, 1/2W.
R29	RE-171	Resistor, 22K, 2W.
R30	RE-15	Resistor, 10K, 1W.
R31	RE-352	Resistor, 4.7K, 1/2W.
R32	RE-352	Resistor, 4.7K, 1/2W.
R33	RE-302	Resistor, 470K, 1/2W.
R34	RE-335	Resistor, 1.2K, 1/2W.
R35	RE-28	Resistor, 220K, 1W.
R36	RE-298	Resistor, 22K, 1/2W.
R37	RE-290	Resistor, 1Meg., 1/2W.
R38	RE-369	Resistor, 2.2K, 1/2W.
R39	RE-26	Resistor, 100K, 1W.
R40	RE-26	Resistor, 100K, 1W.
R41	RE-455	Resistor, 82K, 1/2W.
R42	RE-290	Resistor, 1Meg., 1/2W.
R43	RE-332	Resistor, 1.5K, 1/2W.
R44	RE-299	Resistor, 47K, 1/2W.
R45	RE-290	Resistor, 1Meg., 1/2W.
R46	RE-370	Resistor, 820Ω, 1/2W.
R47	RE-352	Resistor, 4.7K, 1/2W.
R48	RE-164	Resistor, 4.7K, 2W.
R49	RE-453	Resistor, 10K, 1/2W.
*R50	RE-444	Resistor, 100Ω, 1/2W. 10%
*R51	RE-407	Resistor, 20K, 10W.
T1	B-6298	Power Transformer
T2	B-6352	Bias And Erase Transformer
L1	B-6297	Choke
L2	CH-8	RFC Choke
M1	FU-1	Fuse 1Amp. @ 250V.
M2		Meter Lamps
M3		Meter Lamps
M4	B-6351	Meter
M5	2W66	Monitor Selector Switch
*M6	9069	Play-Record Switch
M7	2W9	On-Off Toggle Switch

*Note: Items marked with an asterisk are located on the tape transport mechanism.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	6319	Reel Hold Down Knob
2	6205	Turntable
3	6203	Cap - Capstan Idler
4	6211	Capstan Idler (with bushing)
5		Head Cover Assembly
6	6206	Head Assembly (Full Track - No Cover)
7	6208	Tape Guide
8	6202	Tape Guide Cap
9	6201	Bar, Tape Guide
10	BC-8	Ball Bearing (Tape Guide)
11	6273	Cap, Dust Shield, Capstan
12	6219	Dust Seal, Capstan (Felt)
13	KN-7	Play-Record Knob
14	KN-7	Rewind-Fast Forward Knob
15	6244	Hub (with shaft)
16	6233	Record Safety Button
17	6234	Leaf Spring (Record Safety)
18	BR-20	Capacitor Bracket
19	6910	Spring
20	6224	Spring Anchor
21	6217	Turntable Height Spring
22	6243	Pivot, Takeup
23	BC-34	Ball Bearing
24	6320	Holdback Brake Assembly
25	6293	Collar, "Drum"
26	BB-13	Oilite Bearing
27	6137	Spring Conical
28	6247	Clutch, Play Takeup
29	6248-1	Disc Assembly (with small felt)
	6250-1	Felt Lining, Small
30	6246	Spring, Clutch "U"
31	6251	Clutch Assembly (Fast Forward)
32	6248	Disc Assembly (with large felt)
	6249	Disc
	6250	Felt Lining, Large
33	6254	Washer, Spring Retaining, Cup
34	6253	Link
35	6218	Spring, Control
36	6264	Idler Arm
37	6266	Idler Arm Pulley
38	6221	Link, Turntable Pivot
39	6217	Turntable Height Spring
40	6243	Rewind Pivot
41	BC-34	Ball Bearing
42	6320	Holdback Brake Assembly
43	6293	Collar, "Drum"
44	6316	Collar, Spacer
45	6246	Spring, Clutch "U"
46	6251	Clutch Assembly, (Rewind)
47	6248	Disc Assembly (with large felt)
	6249	Disc
	6250	Felt Lining, Large
48	6236	Capstan Arm Sub-Assembly (with oilite bearing)
49	6237	Roller, Arm Sub-Assembly
50	6262	Felt Washer (Capstan)
51	6272	Capstan Shaft
52	6222	Flywheel
53	OR-10	Takeup Belt-Rubber "O" Ring
54	2871-3	Flywheel Drive Belt, Nylon
55	6239	Motor
56	6240	Motor Mounting Plate
57	6241	Motor Pulley
58	BC-21S	Ball, 5/16", (Motor Thrust)
59	6285	Idler Sub-Assembly (Idler and Bushing)
60	6288	Guide Assembly, Idler
61	6136	Spring, Rewind Idler
62	6279	Brake Shock Relief Assembly
63	6275	Sub-Plate Casting
64	6934	Thrust Disc
65	MS-32-397	Adjust Screw-Nut Assembly, 3/8-27 Bodine
66	MS-32-27-375	Adjust Screw, 3/8-27 Bodine
67	9075	Anti-Turn Disc
68	6934	Thrust Disc
69	6278	Release Lever
70	6215	Spring, Release Lever
71	6216	Spring, Actuator
72	6277	Slide Lever
73	6138	Spring, Takeup Arm
74	6270	Takeup Arm
75	6268	Pulley, Takeup Arm (with oilite bushing)
76	6911	Detent Spring
77	BC-21S	Ball, 5/16" (Turntable Centering Detent)
78	6216	Spring, Idler Arm
79	BC-15S	Ball, 1/4", (Capstan Thrust)

AMPEX
MODEL 620



AMPEX
MODEL 620

TRADE NAME	Ampex Model 620
MANUFACTURER	Ampex Corp., 934 Charter St., Redwood City, Calif.
TYPE SET	AC Operated Portable 10 Watt Audio Amplifier
TUBES (Five)	Types 5879 AF Amp., 12AU7 AF Amp.-Phase Inverter, (2) 6V6GT Output, 6AX5GT Rectifier
POWER SUPPLY	110-120 Volts AC-50/60 Cycles RATING .47 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON THE AMPEX RECORDER MODEL 600, SOMTIMES USED IN CONJUNCTION WITH THE AMPEX MODEL 620 AMPLIFIER SEE FOLDER 2 IN THIS SET.

PROPERTY OF
L. F. BLANKENSHIP
3014 MIAMI ST.
DENVER, COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		AMPEX PART No.	STANDARD REPLACEMENT	
V1	AF Amplifier	5879	5879	
V2	AF Amplifier-Phase Inv.	12AU7	12AU7	
V3	Output	6V6GT	6V6GT	
V4	Output	6V6GT	6V6GT	
V5	Rectifier	6AX5GT	6AX5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	AMPEX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	450	CO-418	AFH2-56	B044	FP238	TM-4020-450	D-230	TVL-3780
B	▲20	450							
C2	10	450	CO-55	PRS450V10	BR1045	TC72	TD-10-450	FM-4510	TVA-1705
C3	4	450	CO-54	PRS450V4	BR445	TC70	TD-4-450	FM-4504	TVA-1702
C4	25	25	CO-59	PRS25V25	BR252	TC26	TD-25-25	FM-0225	TVA-1205

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	AMPEX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	1000	500	CO-20	S11000	D6-102	1W5D1	GP2L-102	MC255	1FM-21	
C6	100	500	CO-17	NP0-S1100	TCZ-100	5R5T1	NP0-337-101	MCB235	MS-31	
C7	.1	400	CO-294	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C8	.047	400	CO-332	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C9	.047	400	CO-332	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C10	20000			BPD-02	DD-203	K085	817-02		5HK-S2	
C11	20000			BPD-02	DD-203	K085	817-02		5HK-S2	
C12	.1	200								

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AMPEX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	25KΩ	½	RE-673	AB-28	A47-25K-W	Q13-120	U-28A	Level
B	Shaft		Not Req.	AK-9	RS-2	Not Req.	Not Req.	Attach to R1A
R2A	50KΩ	½	RE-482	AB-31	A47-50K-S	Q11-123	U-35	Equalization
B	Shaft		Not Req.	AK-9	RS-2	Not Req.	Not Req.	Attach to R2A

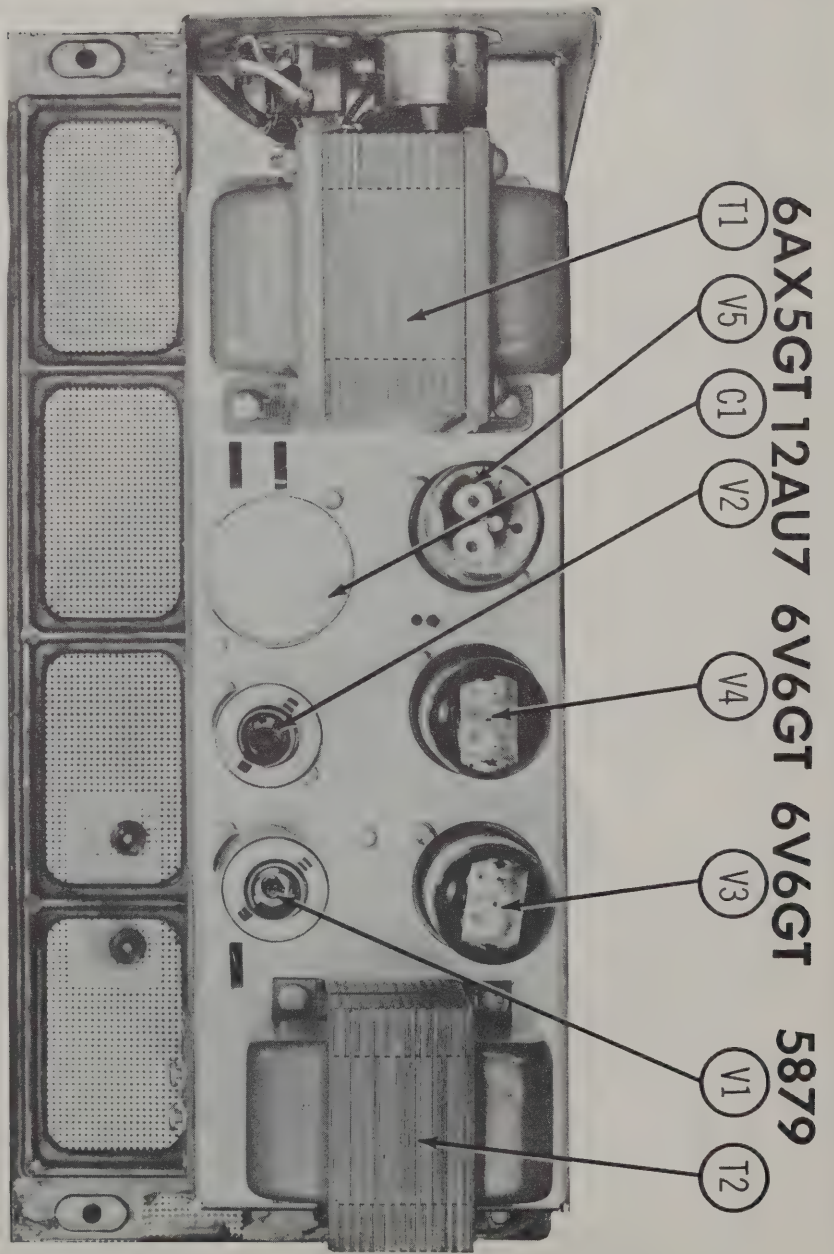
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AMPEX PART No.	IRC PART No.	
R3	33KΩ	½	RE-295	BTS-33K	
R4	22KΩ	½		BTS-22K	Note 1
R5	180KΩ	½	RE-652	BTS-180K	
R6	180KΩ	½	RE-652	BTS-180K	
R7	120KΩ	½	RE-716	BTS-120K	
R8	33KΩ	½	RE-295	BTS-33K	
R9	750Ω 5%	½	RE-592	BTS-750 5%	
R10	39KΩ	½	RE-553	BTS-39K	
R11	100KΩ	½	RE-300	BTS-100K	
R12	1.5Meg	½	RE-340	BTS-1.5Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AMPEX PART No.	IRC PART No.	
R13	100KΩ	½	RE-300	BTS-100K	
R14	82KΩ	½	RE-455	BTS-82K	
R15	27KΩ	1	RE-19	BTA-27K	
R16	270KΩ	½	RE-297	BTS-270K	
R17	270KΩ	½	RE-297	BTS-270K	
R18	360Ω 5%	2		BTB-360 5%	Note 2
R19	1500Ω	2	RE-159	BTB-1500	
R20	22KΩ	½		BTS-22K	
R21	120KΩ	½	RE-716	BTS-120K	
R22	150Ω	½		BTS-150	
R23	33KΩ	½	RE-295	BTS-33K	

Note 1. Some version use a 33KΩ, ½ watt resistor in this application (part #RE-295).
Note 2. Some versions use a 390Ω, 5%, 2 watt resistor in this application (part #RE-516).

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	AMPEX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @.47A	666VCT .070ADC	6.3VAC @1.12A	6.3VCT @1.37A	B9402					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	AMPEX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	8.5KΩ CT	13.4Ω	B-9403						

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	AMPEX PART No.	QUAM PART No.	RCA TYPE No.	
SP1	8"	PM	13.4Ω	SQ-16	8A6Z13LF		

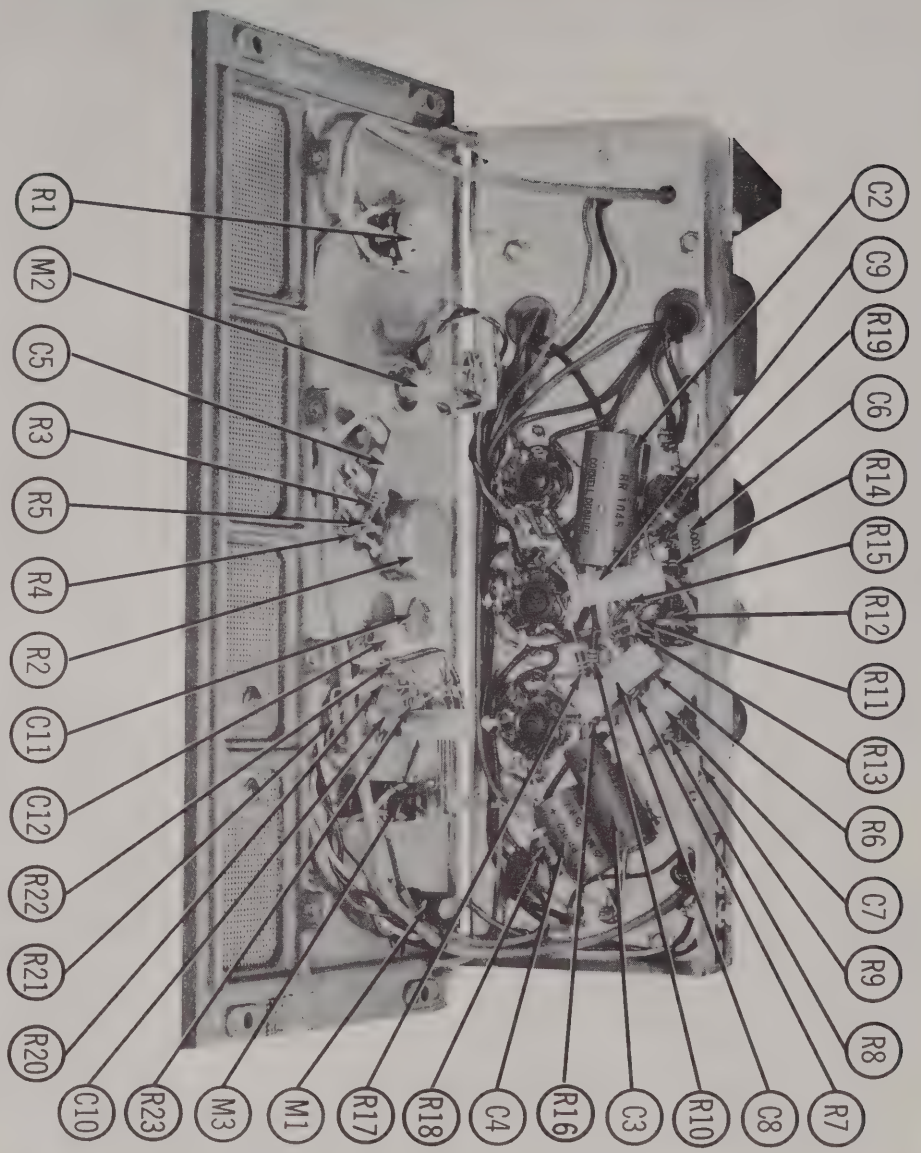
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			AMPEX PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1½A 250V	FU-1		31201.5 (3AG 1½A)	342008	AGC 1½	HKP

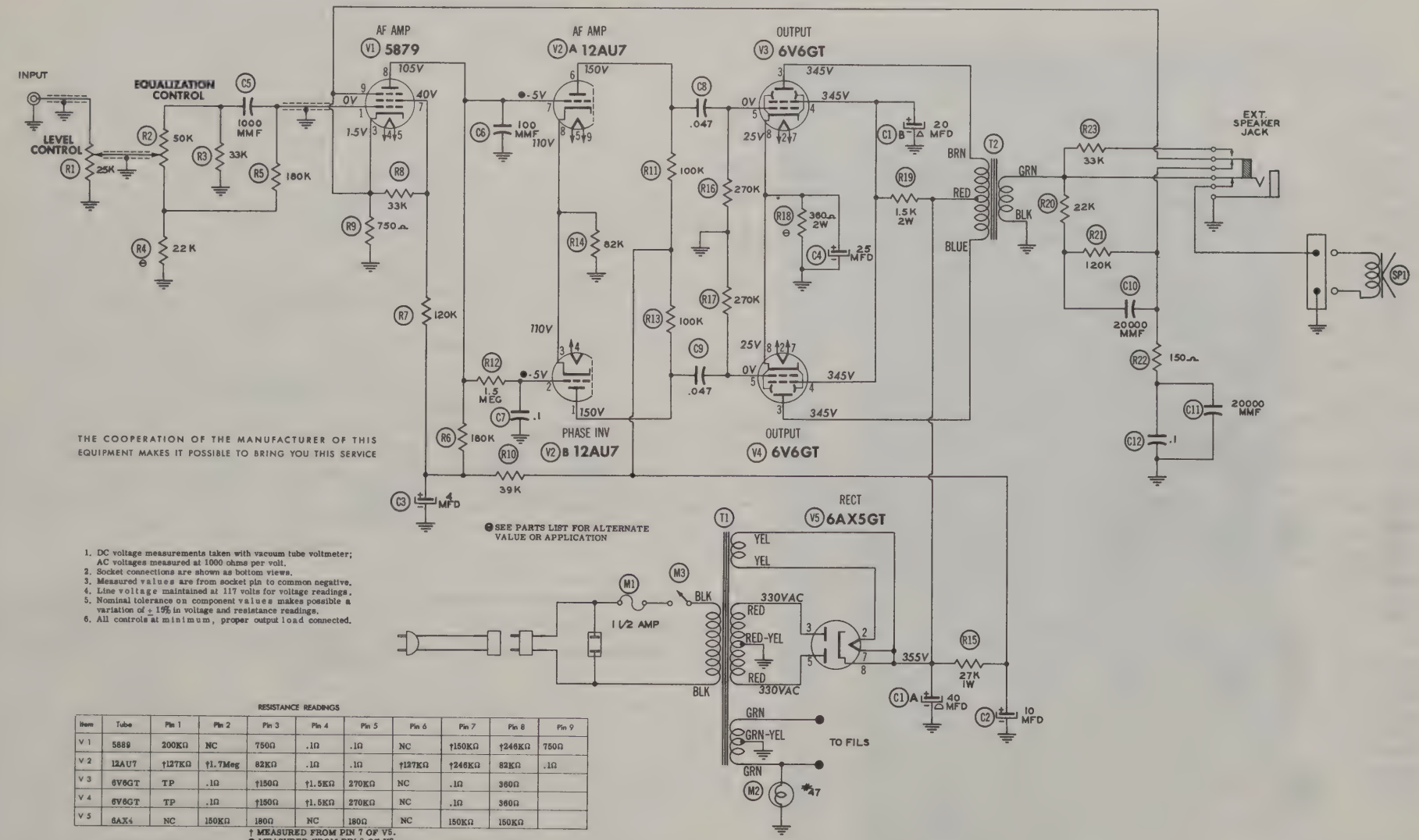
MISCELLANEOUS

ITEM No.	PART NAME	AMPEX PART No.	NOTES
M2	Pilot Light	LA-5	#47
M3	Switch		Power (on-off)
	Case	D-9404	Complete with hardware

CHASSIS—BOTTOM VIEW



AMPEX Model 620



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	5889	200KΩ	NC	750Ω	.1Ω	.1Ω	NC	†150KΩ	†246KΩ	750Ω
V 2	12AU7	†127KΩ	†1.7Meg	82KΩ	.1Ω	.1Ω	†127KΩ	†246KΩ	82KΩ	.1Ω
V 3	6V6GT	TP	.1Ω	†150Ω	†1.5KΩ	270KΩ	NC	.1Ω	360Ω	
V 4	6V6GT	TP	.1Ω	†150Ω	†1.5KΩ	270KΩ	NC	.1Ω	360Ω	
V 5	6AX4	NC	150KΩ	180Ω	NC	180Ω	NC	150KΩ	150KΩ	

† MEASURED FROM PIN 7 OF V5.
● MEASURED FROM PIN 8 OF V2.
NC - NO CONNECTION.
TP-TIE POINT.

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RETMA MEMBER

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DUMONT CHASSIS RA-350

TRADE NAME	Dumont	MODELS	CHASSIS
		Cabot, Carlisle, Carol, Tabor Talbot, Taft, Tarkington	RA-350 VHF RA-351 UHF-VHF
MANUFACTURER	Allen B. Dumont Laboratories, Inc., 257 Sixteenth Ave., Paterson, N.J.		
TYPE SET	Television Receiver		
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.72 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 1
Horizontal Sweep Circuit Adjustments 16
Parts List and Descriptions 12, 13, 14
Photographs
Cabinet-Rear View 16
Capacitor Identification 3, 10
Chassis-Top View 11
RF Tuner 15
Resistor Identification 4, 9
Photographs (Cont)
Trans., Inductor & Alignment Identification 11
Resistance Measurements 8
Servicing in the Field 1
Schematic (Alternate Tuner) 16
Schematic (TV) 2
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

DUMONT
CHASSISS RA-350, RA-351

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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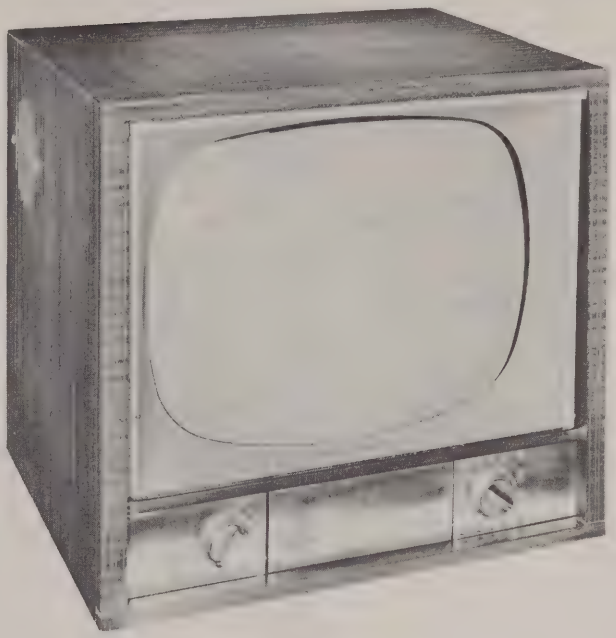
DUMONT
CHASSISS RA-350, RA-351



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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.

2. Remove 4 wood screws. Remove rear cover.

3. Disconnect speaker leads and antenna leads from tuner.

4. Remove picture tube socket, HV lead, yoke plug and ground strap.

5. Remove 4 chassis bolts. Remove chassis.

6. Remove 2 speaker nuts. Remove speaker.

MODELS	CHASSIS
Cabot, Carlisle, Carol, Tabor, Talbot, Taft, Tarkington	RA-350 (VHF) RA-351 (VHF-UHF)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 4 wood screws holding metal strip at the top edge of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

SPECIAL ADJUSTMENTS

A. Noise Control Adjustment
Adjust the noise control (R4) for picture with stable sync. If adjusted too far clockwise picture will have unstable sync.

B. Dumonitor Control Adjustment
The dumonitor (AGC) control is properly adjusted at the factory and normally will not require readjustment. To adjust the AGC control to prevent overloading on very strong signals, the following procedure should be used:

1. Set horizontal hold control for maximum straightness of vertical elements of test pattern or picture near the top of the raster.
2. Adjust the AGC control until overloading is eliminated.
3. Switch momentarily to another channel and back again.
4. If overloading reappears in step 3, readjust AGC control.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control to its mid-range position and adjust the horizontal stabilizer slug (B1) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary slug (A12) located on top of the chassis.

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DUMONT
CHASSISS RA-350, RA-351

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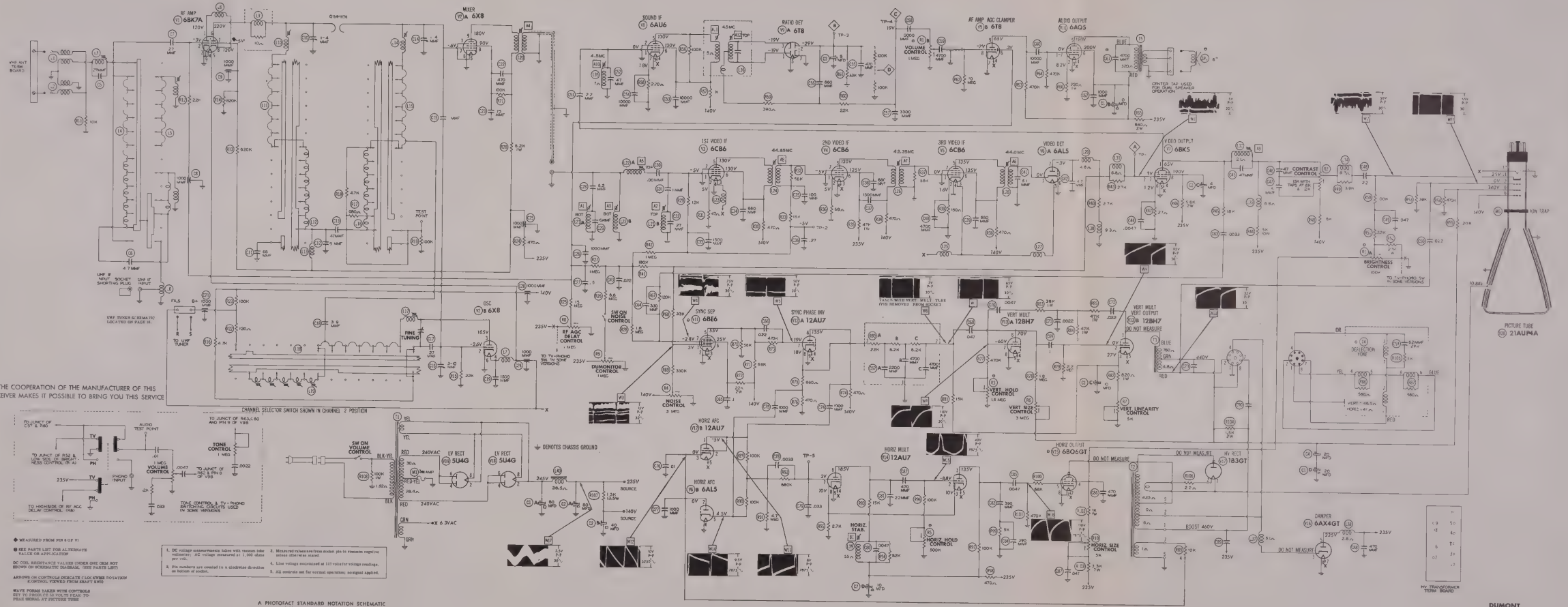
RF AMP V1 6BK7A
MIXER V2 A 6X8
SOUND IF V8 6AU6
RATIO DET V9 A 6T8
AF AMP AGC CLAMPER V9 B 6T8
AUDIO OUTPUT V10 6AQ5
1ST VIDEO IF V3 6CB6
2ND VIDEO IF V4 6CB6
3RD VIDEO IF V5 6CB6
VIDEO DET V6 A 6AL5
VIDEO OUTPUT V7 6BK5
OSC V2 B 6X8
SYNC SEP V11 6BE6
SYNC PHASE INV V13 A 12AU7
VERT MULT V13 A 12BH7
VERT MULT VERT OUTPUT V13 B 12BH7
HORIZ AFC V17 B 12AU7
HORIZ AFC V16 B 6AL5
HORIZ MULT V14 12AU7
HORIZ OUTPUT V15 6BQ6GT
HV RECT V17 1B3GT
DAMPER V16 6AX4GT
LV RECT V18 5U4G
LV RECT V18 5U4G
PICTURE TUBE V19 21AUP4A
VOLUME CONTROL 1 MEG
CONTRAST CONTROL
BRIGHTNESS CONTROL
RF AGC DELAY CONTROL 1 MEG
SW ON NOISE CONTROL
DUMONITOR CONTROL 1 MEG
NOISE CONTROL 3 MEG
VERT HOLD CONTROL 1.5 MEG
VERT SIZE CONTROL 3 MEG
VERT. LINEARITY CONTROL 5K
HORIZ HOLD CONTROL 500K
HORIZ SIZE CONTROL 5K
FINE TUNING
TONE CONTROL 1 MEG
VOLUME CONTROL 1 MEG
SW ON VOLUME CONTROL
DEFLECTION YOKE
KIN TRAP
HV TRANSFORMER TERM. BOARD
CENTER TAP USED FOR DUAL SPEAKER OPERATION
DO NOT MEASURE
BOOST 460V
TEST POINT
UHF IF INPUT SOCKET
UHF IF INPUT SHORTING PLUG
UHF TUNER SCHEMATIC LOCATED ON PAGE 16.
TO UHF TUNER
TO TV-PHONO SW. IN SOME VERSIONS
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 2 POSITION
TONE CONTROL & TV - PHONO SWITCHING CIRCUITS USED IN SOME VERSIONS
DENOTES CHASSIS GROUND
240VAC
6.3VAC
235V SOURCE
140V SOURCE
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

◆ MEASURED FROM PIN 8 OF V1

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

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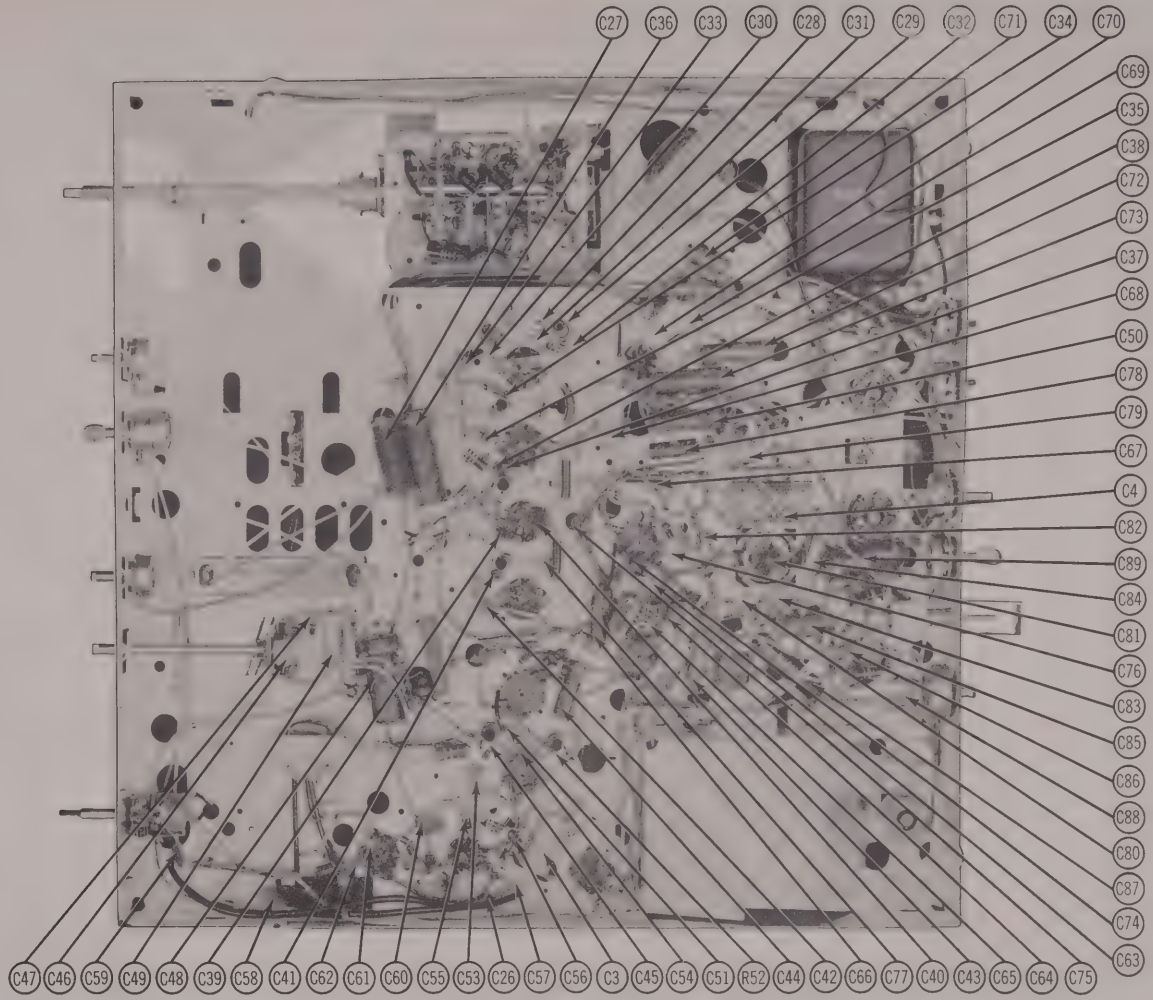
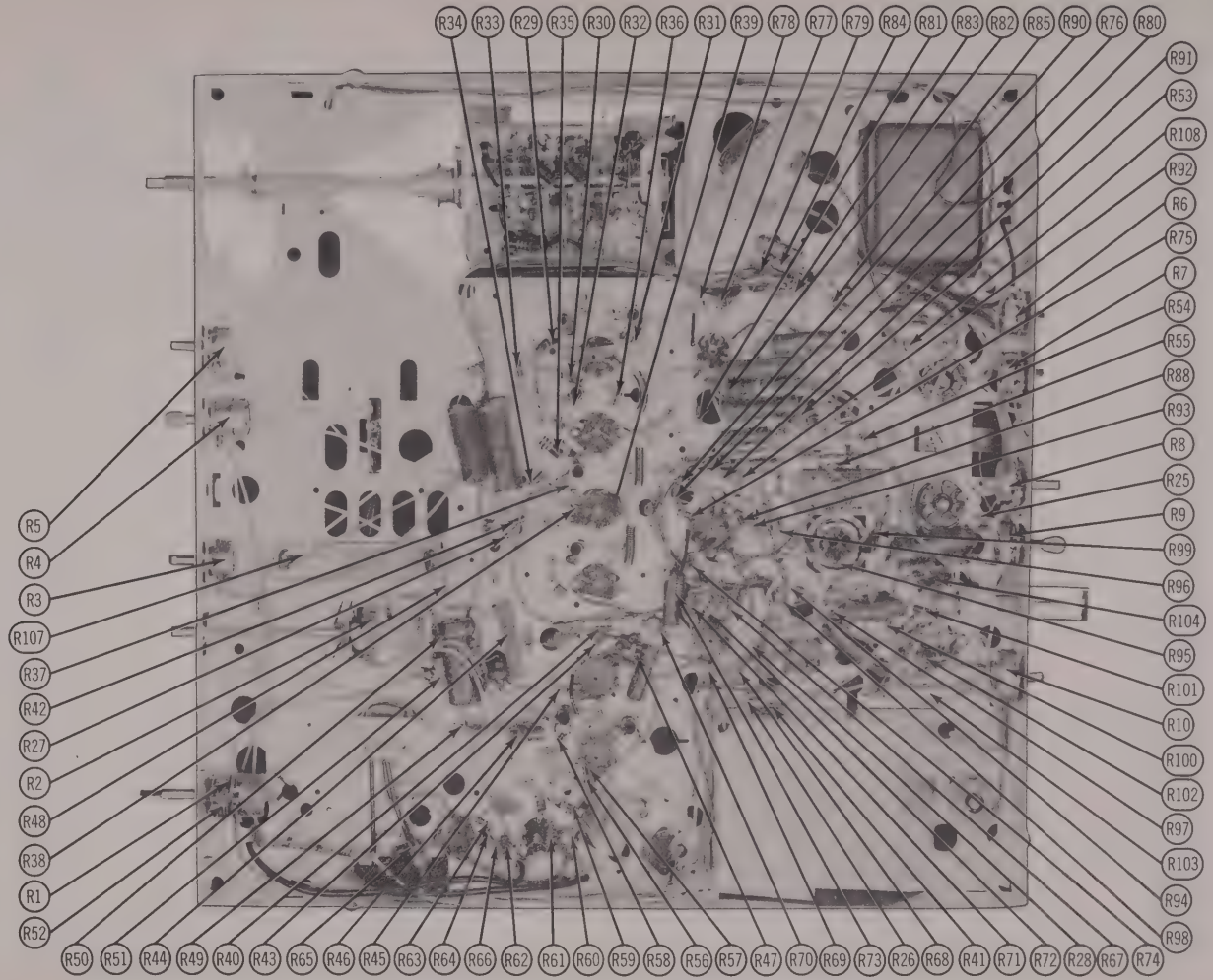
DUMONT
CHASSISS RA-350, RA-351

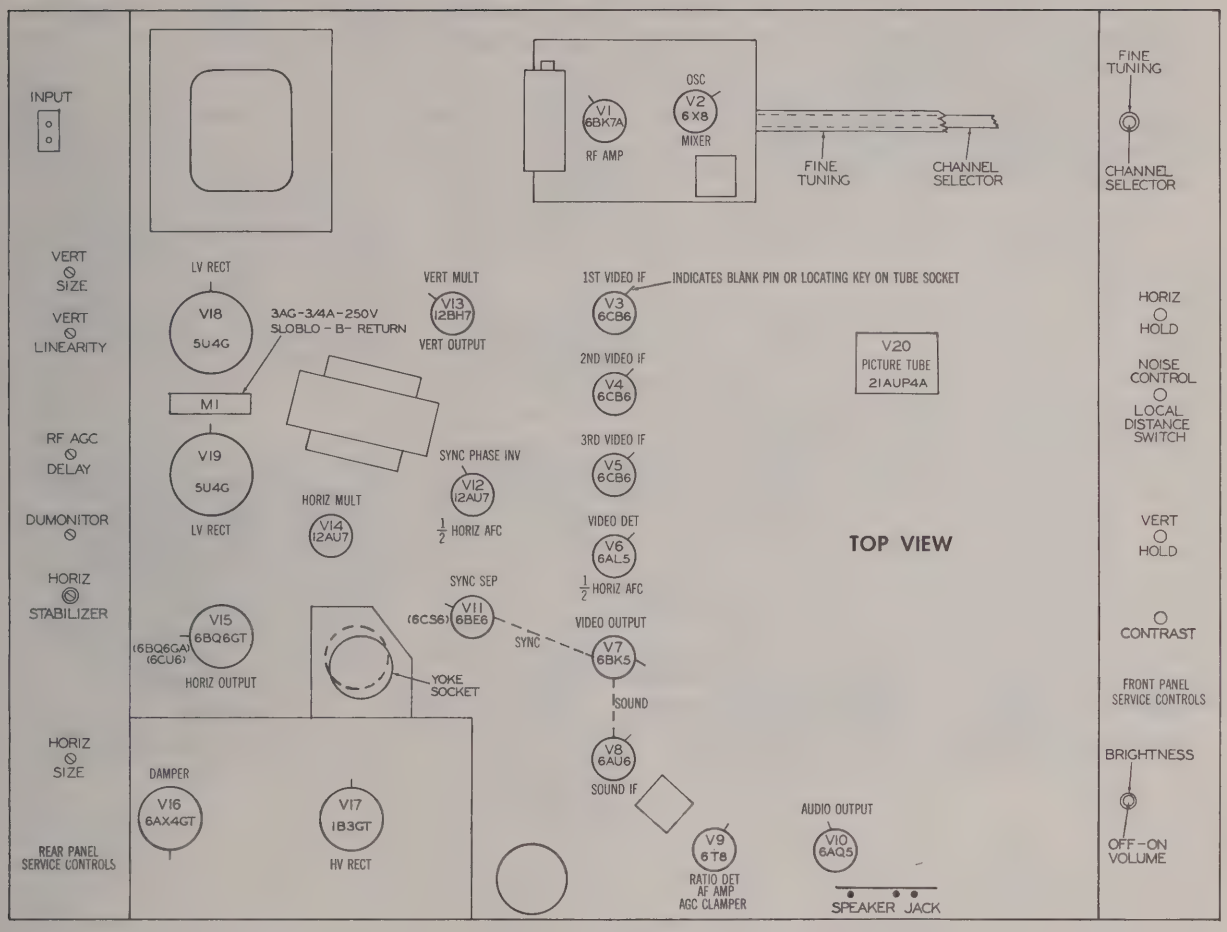


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V18, V19, Fuse (M1)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V7**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V7, V20**
Has pic, no sound - **V8, V9, V10**
Overloaded picture - **V9**

SYNC FAILURE
No vert. sync - **V12, V13**
No horiz. sync - **V6, V12, V14**
No vert. or horiz. sync - **V11, V12**

SWEEP FAILURE
No raster, has sound - **V14, V15, V16, V17, V20**
No vertical deflection - **V13**
Poor vert. linearity or foldover - **V13**
Poor horiz. linearity or foldover - **V14, V15, V16**
Narrow picture - **V14, V15, V16, V17, V18, V19**
Vert. off freq. - **V12, V13**
Horiz. off freq. - **V6, V12, V14**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Remove horizontal output tube (V15) and the damper tube (V16). To disable the high voltage.
Connect yoke, speaker, and picture tube during alignment.

VIDEO IF ALIGNMENT

Disable local oscillator by replacing the mixer-oscillator tube (V2) with one having pin 3 clipped off. Connect the high side of the signal or sweep generator to a floating shield over the dummy 6X8.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to floating shield over dummy 6X8. Low side to chassis.	43.5MC (10MC Swp.)	41.25MC 42.25MC 45.75MC 47.25MC	Any	Vert. Amp. thru detector (Fig. 1) to pin 5 (plate) of 6CB6 (V3). Low side to chassis.	A1, A2, A3, A4, A5	Use only enough sweep generator output for useable pattern on scope. Adjust A1 thru A5 for response curve similar to Fig. 2. Adjust A1 to place 41.25MC Trap marker. A2 places 47.25MC trap marker. A3 places 42.25MC marker approximately 55% on response curve. Adjust A4 and A5 to place 45.75MC marker at 70% on response curve and correct tilt. Repeat step 1 until markers are in correct positions as in Fig. 2.
2.	"	"	Not used	44.0MC	"	Use VTVM DC probe to point (A). Common to chassis.	A6	Attenuate generator output to maintain not more than 2 volts on VTVM. Adjust for maximum deflection.
3.	"	"	"	42.35MC	"	"	A7	"
4.	"	"	"	44.85MC	"	"	A8	"
5.	"	"	43.5MC (10MC Swp.)	41.25MC 42.25MC 45.75MC 47.25MC	"	Use scope. Vert. Amp. thru 27KΩ to point (A). Low side to chassis.		Connect the negative lead of a 5 volt bias supply to the ungrounded side of C27. Positive lead to chassis. Check for response curve similar to Fig. 3. If necessary, retouch A6, A7 and A8 for desired response. Adjust A7 to place 42.25MC marker at 50% on response curve. Adjust A8 to place 45.75MC marker at 50% on high side of response curve. A1 and A2 places 41.25MC and 47.25MC trap markers. Adjust A6 for MINIMUM dip and tilt. Do not readjust A3, A4, and A5.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to point (A). Low side to chassis.	Not used	4.5MC (400∿ Mod.)	Any	Vert. Amp. thru detector (Fig. 1) to pin 11 (cathode) of picture tube. Low side to chassis.	A9	Adjust for MINIMUM 400∿ indication on scope.

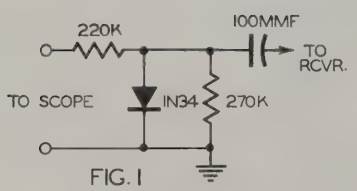


FIG. 1

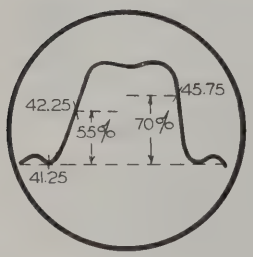


FIG. 2

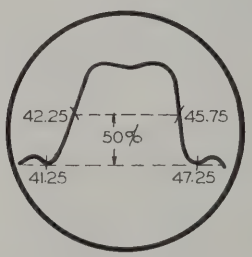


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Direct	High side to point Ⓐ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp to point Ⓑ. Low side to chassis.	A10, A11	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 4.
8.	"	"	"	"	"	Vert. Amp to point Ⓒ. Low side to chassis.	A12	Reconnect stabilizing capacitor C3. Adjust so that 4.5MC marker occurs at crossover lines as in Fig. 5. SLIGHTLY retouch A11 for maximum amplitude and straightness of crossover lines. Replace original 6X8 in its socket.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in sereis from point Ⓑ to chassis. The junction of these two resistors is alignment point Ⓓ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	Direct	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe to point Ⓑ. Common to chassis.	A10 A11	Adjust for maximum deflection.
8.	"	"	"	"	DC probe to point Ⓒ. Common to point Ⓓ.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Remove 100KΩ resistors. Replace original 6X8 in its socket.

OSCILLATOR ALIGNMENT

Set the fine tuning control to the center of its range. Set the channel selector to the highest high-band channel station operating in the area. Adjust the high-band oscillator adjustment (A13) for best picture detail. Check all other high-band channels available. If one fails to come in range of the fine tuning, it may be necessary to compromise by retouching A13.
Set the channel selector to each low-band channel (2-6) operating in the area. Adjust the proper oscillator slug for each channel in turn for best picture detail. A14 is for channel 6, A15 for 5 etc. If a slug does not have sufficient range for a particular channel, it may be necessary to adjust the slug intended for the next higher channel.

VHF RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

UHF TUNER ALIGNMENT

In the event the UHF oscillator tube is replaced, it is recommended that several tubes be tried and the one which works best should be used. Alignment of the UHF tuner is not recommended in the field.

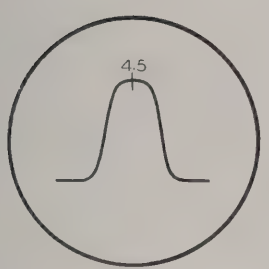


FIG. 4

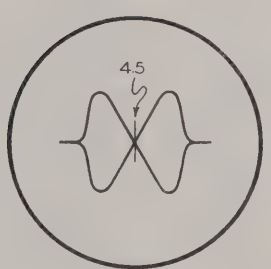
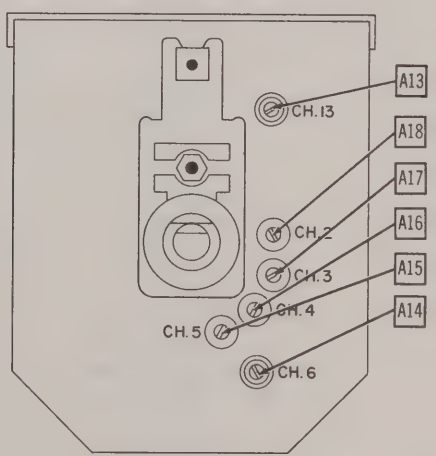


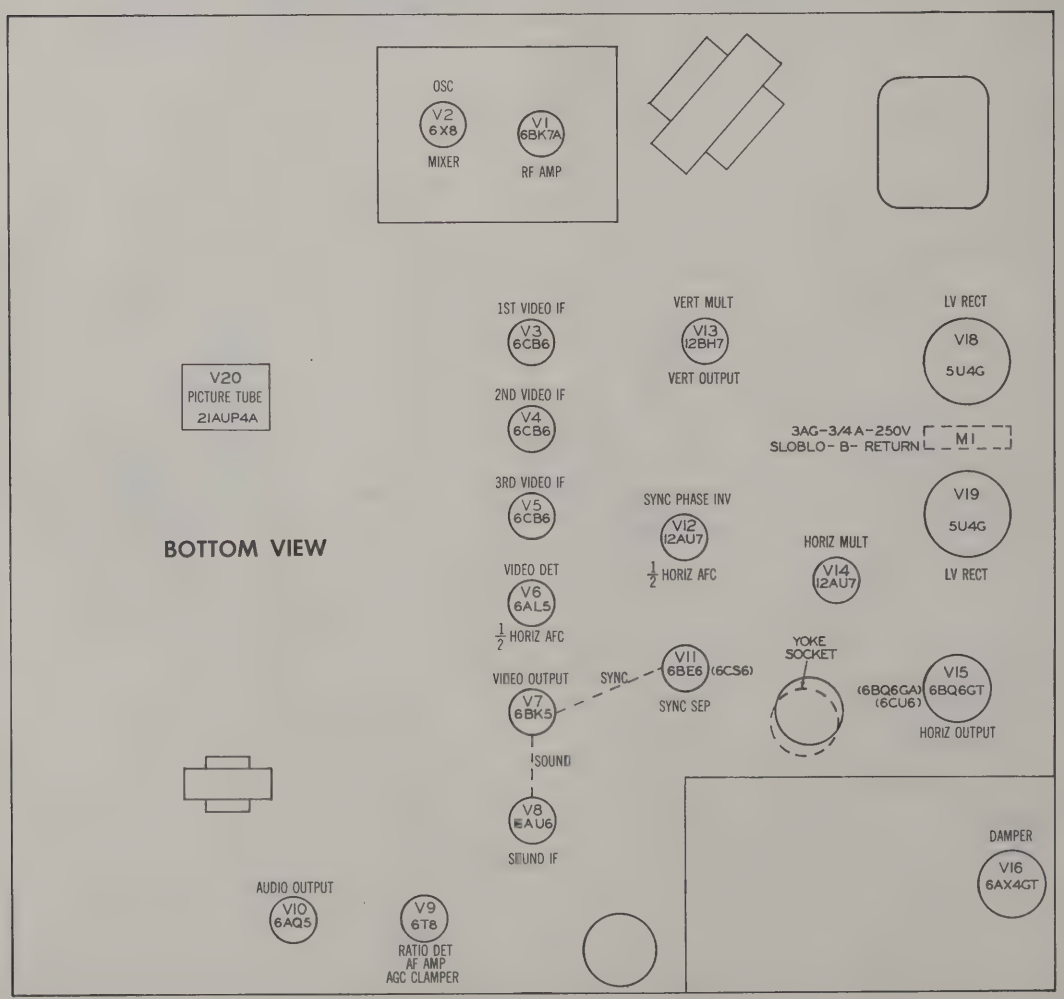
FIG. 5



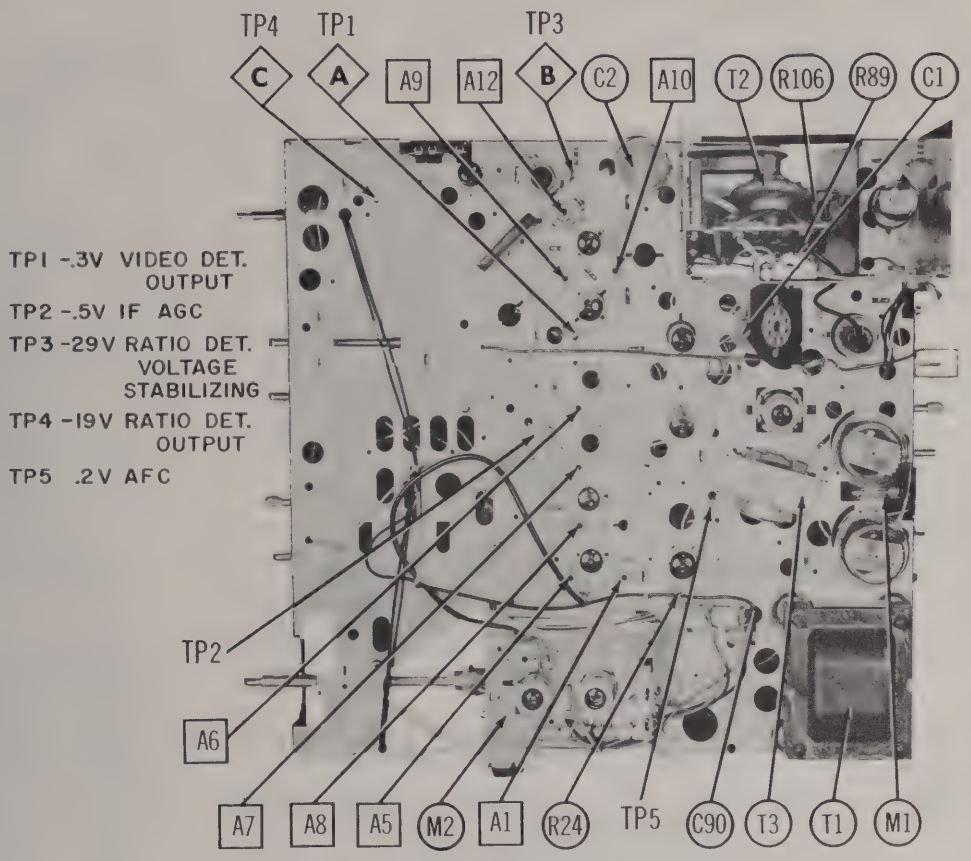
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7A	INF	1. 2Meg	0Ω	0Ω	. 1Ω	† 500Ω	360KΩ	INF	0Ω
V 2	6X8	0Ω	22KΩ	† 6KΩ	. 1Ω	0Ω	0Ω	100KΩ	† 110KΩ	† 8. 7KΩ
V 3	6CB6	1. 2Meg	47Ω	. 1Ω	0Ω	† 1. 8KΩ	† 1. 8KΩ	0Ω		
V 4	6CB6	1. 2Meg	68Ω	. 1Ω	0Ω	† 1. 8KΩ	† 47KΩ	0Ω		
V 5	6CB6	. 1Ω	180Ω	. 1Ω	0Ω	† 1. 8KΩ	† 1. 8KΩ	0Ω		
V 6	6AL5	. 1Ω	10KΩ	. 1Ω	0Ω	4. 8Meg	0Ω	2. 7KΩ		
V 7	6BK5	† 4. 2KΩ	NC	2. 7KΩ	. 1Ω	0Ω	27Ω	2. 7KΩ	† 5. 6KΩ	NC
V 8	6AU6	1. 7Ω	0Ω	0Ω	. 1Ω	† 2. 3KΩ	† 2. 3KΩ	220Ω		
V 9	6T8	INF	33KΩ	INF	. 1Ω	0Ω	1. 2Meg	0Ω	10Meg	† 470KΩ
V 10	6AQ5	470KΩ	220Ω	0Ω	. 1Ω	† 1KΩ	† 750Ω	470KΩ		
V 11	6BE6	35KΩ	0Ω	. 1Ω	0Ω	† 45KΩ	† 23KΩ	1. 8Meg		
V 12	12AU7	4. 8Meg	4. 8Meg	10KΩ	. 1Ω	. 1Ω	† 1. 8KΩ	550KΩ	1. 1KΩ	0Ω
V 13	12BH7	▲ 2. 3KΩ	2. 2Meg	2. 8KΩ	. 1Ω	. 1Ω	▲ 2. 5Meg	1Meg	0Ω	0Ω
V 14	12AU7	† 100KΩ	100KΩ	2. 7KΩ	. 1Ω	. 1Ω	† 15KΩ	5Meg	2. 7KΩ	0Ω
V 15	6BQ6GT	TP	. 1Ω	NC	† 7KΩ	470KΩ	NC	0Ω	0Ω	TOP CAP ▲ 16Ω
V 16	6AX4GT	NC	NC	500KΩ	NC	† 40Ω	NC	. 1Ω	0Ω	
V 17	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 441Ω
V 18	5U4G	NC	30KΩ	NC	29Ω	NC	29Ω	NC	30KΩ	
V 19	5U4G	NC	30KΩ	TP	31Ω	NC	31Ω	NC	30KΩ	
V 20	21AUP4A	0Ω	39KΩ	PIN 6 † 1. 3KΩ	PIN 10 ▲ 120KΩ	PIN 11 † 160KΩ	PIN 12 . 1Ω			

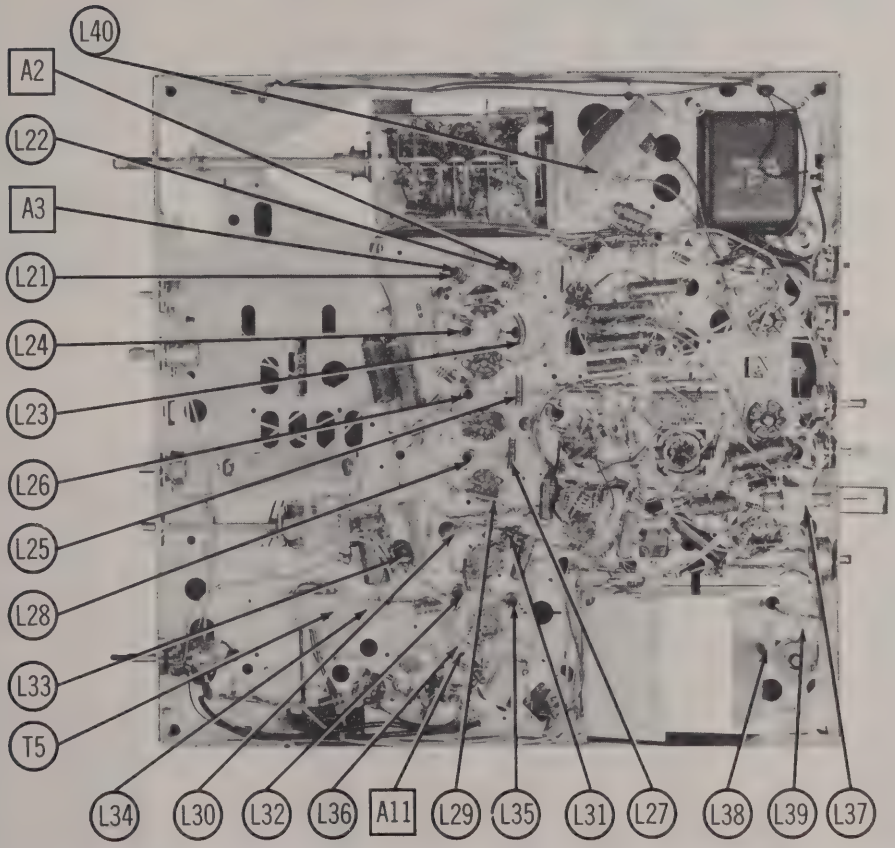
† MEASURED FROM PIN 2 OF V18.
▲ MEASURED FROM PIN 3 OF V16.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

SET 312 FOLDER 4

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: DUMONT PART No.	STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BK7A	6BK7A	
V2	Mixer-Oscillator	6X8	6X8	
V3	1st. Video IF Amplifier	6CB6	6CB6	
V4	2nd. Video IF Amplifier	6CB6	6CB6	
V5	3rd. Video IF Amplifier	6CB6	6CB6	
V6	Video Detector-Horiz. AFC	6AL5	6AL5	
V7	Video Output	6BK5	6BK5	
V8	Sound IF Amplifier	6AU6	6AU6	
V9	Ratio Detector-AF Amplifier-AGC Clamper	6T8	6T8	
V10	Audio Output	6AQ5	6AQ5	
V11	Sync Separator	6BH6	6BH6	6CB6 may be used as an alternate
V12	Sync Phase Inverter-Horiz. AFC	12AU7	12AU7	
V13	Vert. Mult.-Vert. Output	12BH7	12BH7	
V14	Horiz. Mult.	12AU7	12AU7	
V15	Horiz. Output	6BQ6GT	6BQ6GT	6BQ6GA or 6CU6 may be used as an alternate
V16	Damper	6AX4GT	6AX4GT	
V17	HV Rectifier	1B3GT	1B3GT	
V18	LV Rectifier	5U4G	5U4G	
V19	LV Rectifier	5U4G	5U4G	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: DUMONT PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V20	21AUP4A ①	21AUP4A ①		21AUP4A ① 21AUP4 ② 21AUP4A ③ B ③	① Aluminized ② Silver screen "35"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	VOLT.	REPLACEMENT DATA: DUMONT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	⌀80	350	031514427	AFH4-07	DU8	FP333.8	TM-804020-450	Q-020	TVL-3727
B	▲10	350			HR105	TC32	TD-10-50	FM-0510	TVA-1304
C	10	50							
D	▲20	350							
C2A	⌀80	350	031514428	AFH4-92-75	C037	FP385.5	TM-804020-450	Q-025	TVL-3792
B	▲40	350			HR435	TC50	TD-4-450	MT-4504	TVA-1801
C	4	350							
D	▲10	350							
C3	5	100	031383563	PRS150V4	HR415	TC40	TD-4-150	FM-1504	TVA-1402
C4	20	350	031383564	PRS450V20	HR3035	TC55	TD-20-350	FM-4520	TVA-1608

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: DUMONT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	27				TCZ-27	T216	NP0L-270			
C6	4.7			NP0-4J4.7	TCZ-4R7	T207	NP0A-4R7	ZT-5547	5TCCB-V47	
C7	27				TCZ-27	T216	NP0L-270			
C8	1000									
C9	1000									
C10	1-4			839-4		3115-01-10	CT8S1			
C11	68									
C12	91									
C13	47			N750-D47	TCN-47	N033	N750K-470	NT-5447	5TCU-Q47	
C14	1-4						3115-01-10	CT8S1		
C15	1			NP0-E1	TCZ-1	T203	NP0A-010		5TCCB-V1	
C16	3-10				839-10					
C17	27				TCN-27	T209	N750K-S70			
C18	3.9									
C19	1500			BPD-0015	DD-152	K071	501-0015	DC-5315	5HK-D15	
C20	1000									
C21	1000									
C22	0.047			BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C23	75			S175	DD-750	G089	801-750	UC-5476	5GA-Q75	
C24	1000									
C25	1000									
C26	1000			BPD-001	DD-102	K069	801-001	DC-531	5HK-D1	
C27	.15	200		03140370						
C28	6.8			03140440						
C29	15			NP0-E15	TCZ-15	T211	NP0K-150		5TCC-Q15	
C30	100			03151900	D6-101	T204	GPZK-101	UC-531	5GA-T7	
C31	1			03138330	NP0-E1	TCZ-1	T203	NP0A-010		5TCCB-V1
C32	27				TCZ-27	T216	NP0L-270			
C33	1500			03153710	BPD-0015	DD-152	K071	501-0015	DC-5315	5HK-D15
C34	680			03168880	S1680	D6-681	T250	GPZK-681	UC-5388	5GA-T68
C35	100			03151550	BPD-0001	DD-101	K042	501-101	DC-531	5GA-T1
C36	.37	300		03140170						
C37	1500			03153710	BPD-0015	DD-152	K071	501-0015	DC-5315	5HK-D15
C38	680			03168880	S1680	D6-681	T250	GPZK-681	UC-5388	5GA-T68
C39	680			03168880	S1680	D6-681	T250	GPZK-681	UC-5388	5GA-T68
C40	4700			03153740	BPD-0047	DD-472	K079	511-0047	DC-535	5HK-D47
C41	5.1			03153180						
C42	4.7			03168750	NP0-4J4.7	TCZ-4R7	Z009	NP0A-4R7	ZT-5547	5TCCB-V47
C43	.022	200		03140230	BPD-22	DF-223	CUB6822	31T-03	PT6122	47M-G22
C44	.0047	500		03141040	SH4700	D6-472	CUB6D47	GP2-333-472	PT6347	67M-D47
C45	47			03151550	NP0-E47	TCZ-47	T233	NP0-338-470	ZT-5447	5TCC-Q47
C46	47			03151550	NP0-E47	TCZ-47	T233	NP0-338-470	ZT-5447	5TCC-Q47
C47	15			03133010	N750-D15	TCN-15	N021	N750K-150		5TCU-Q15
C48	.22	400		03141140	P4S4N-S22		CUB4P2		PT4022	47M-P22
C49	.047	400		03141100	BPD-05	DF-503	CUB4247		PT4147	47M-S47
C50	.022	600		03141480	BPD-03	DF-303	CUB6822	31T-03	PT6122	67M-S22
C51	2.2			03152490	NP0-S2.2	TCZ-2R2	T223	NP0A-2R2		5TCCB-V22
C52	47			03151550	NP0-E47	TCZ-47	T233	NP0-338-470	ZT-5447	5TCC-Q47
C53	10000			03015930	BPD-01	DD-103	K083	511-01	DC-511	5HK-S1
C54	10000			03015930	BPD-01	DD-103	K083	511-01	DC-511	5HK-S1
C55	470			03168040	S1470	D6-471	TP46	GPZK-471	UC-5347	5GA-T47
C56	680			03151860	S1680	D6-681	T250	GPZK-681	UC-5388	5GA-T68
C57	3300			03153730	BPD-0033	DE-332	K077	511-0033	UC-5353	5HK-D33
C58	10000			03015930	BPD-01	DD-103	K083	511-01	DC-511	5HK-S1
C59	4700			03153740	BPD-0047	DD-472	K079	511-0047	DC-535	5HK-D47
C60	10000			03015930	BPD-01	DD-103	K083	511-01	DC-511	5HK-S1
C61	4700			03153740	BPD-0047	DD-472	K079	511-0047	DC-535	5HK-D47
C62	1000			03153700	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: DUMONT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No	MALLORY PART No	SPRAGUE PART No	NOTES
C63	.0033	600	03141030	SI300	D6-332	CUB6D33	GP2-333-332	PT6233	67M-D33	
C64	330		03151230	SI330	D6-331	TP43	GPZK-331	UC-5353	5GA-T33	
C65	.1	400	03141130	P4S4N-1	DF-104	CUB4P1		PT401	47M-P1	
C66	.022	200	03140230	BPD-22	DF-223	CUB6822	31T-02	PT4122	47M-S22	
C67A	2200							DC-522		
B	4700		e68000631	ePA-A10	ePC-100	eUETM1	e1405-01	DC-525	eV-1	
C	4700							DC-525		
C68	.047	600	03141500							
C69	.1	600	03141830	P6S8N-1	DF-104	CUB6P1		PT601	67M-P1	
C70	.0047	400	03140580	1404-0047		1R5D47		MC5E45	M3-247	
C71	.0033	600	03140540	1404-0033		1R5D33			M3-233	
C72	.022	600	03141750	BPD-022	DF-223	CUB6822	31T-03	PT6122	67M-S22	
C73	.1	200	03141360	P2S8N-1	CUB2P1			PT201	27M-P1	
C74	1000		03153800	BPD-001	DD-103	K069	801-001	DC-531	5HK-D1	
C75	1000		03153800	BPD-001	DD-103	K069	801-001	DC-531	5HK-D1	
C76	.01	300	03153300	BPD-01	DD-103	CUB6S1	GP3-333-103	PT431	47M-S1	
C77	1000		03153700	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1	
C78	.0033	600	03141030	SI300	D6-332	CUB6D33	GP3-333-332	PT6233	67M-D33	
C79	.033	300	03140330	BPD-03	DF-303	CUB6S33		PT6133	67M-S33	
C80	.0047	600	03139853	1404-0047		1R5D47		MCE455	M3-247	
C81	82		03153930	SI3	D6-820	C084	831-320	MC1026	5GA-Q22	
C82	470	500	03031150	1469-00047		5R5T47		MCE545	M3-347	
C83	330	500	03020500	1469-00039	D6-391	5R5T39	831-391	MCE543	M3-339	
C84	390	500	03020500	1469-00039	D6-391	5R5T39	831-391	MCE543	M3-339	
C85	.0047	600	03141040	SH4700	D6-472	CUB6D47	GP3-333-472	PT6347	67M-D47	
C86	470		03151840	S1470	D6-471	TP46	GPZK-471	UC-5347	5GA-T47	
C87	.047	400	03141100	BPD-05	DF-503	CUB4S47		PT4147	47M-S47	
C88	470		03151560	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C89	.1	600	03141540					PT601	67M-P1	
C90	.1	200	03140120	P2S8N-1	DF-104	CUB2P1		PT401	27M-P1	
C91	62	3000	03254044							

Note 1. Chassis equipped with phono switch and tone control use .0033MFD in this application (Part #03153730).
♦ Items C67A, C67B, C67C, R80A, R80B and R80C are combined in one unit.

CONTROLS

ITEM No	RATING: RESIST ANCE	WATTS	REPLACEMENT DATA: DUMONT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No	MALLORY PART No	INSTALLATION NOTES
R1A	100KΩ	½	01056323	F1-S1		QJ-878 **	UF15L	Brightness (Panel) See Note 1
B	1Meg	½		R2-S2			UR8A	Volume (Rear)
C	Switch			KS-1			UR-26	Attach to R1A.
R1A	100KΩ	½	01056343	F1-S1		QJ-824 ♦	UE1238	Brightness (Panel) See Note 2
B	1Meg	½		R2-S1				Volume (Rear) Tapped at 45KΩ
C	Switch			KS-1				Attach to R1A.
R2A	15KΩ	½	01054571	A5T-154		Q15-118XX		Contrast Tapped at 6KΩ and 12KΩ
B	Shaft		Not Req.	AE-4		Not Req.		Attach to R2A.
C	Coupler		Not Req.			Not Req.		Attach to R2A.
R3A	1. 5Meg	½	01056036	A8-742	A47-1.5Meg-S	QJ-138	TA15L	Vertical Hold-See Note 1
B	Shaft		Not Req.	AE-4	FES-1	Not Req.	Not Req.	Attach to R3A.
R4A	3Meg	½	01054591	A8-84	A47-3Meg-S	QJ-140	U-59	Noise
B	Shaft		Not Req.	AE-4	KS8-3	Not Req.	Not Req.	Attach to R4A.
C	Switch		Not Req.	KS-1	FWS-12	76-1	UR-26	Attach to R4A.
R5A	50KΩ	½	01056033	A8-31	A47-50K-S	QJ-133	TA54L	Horizontal Hold-See Note 1
B	Shaft		Not Req.	AE-4	FES-1	Not Req.	Not Req.	Attach to R5A.
R6A	1Meg	½	01056041	BX-54	A47-1Meg-X	QJ-140	TA36L	Vertical Size
B	Shaft		Not Req.	Not Req.	FES-1	Not Req.	Not Req.	Attach to R6A.
R7A	5000Ω	½	01056021	AB-10	A47-5000-S	QJ-114	TA53L	Vertical Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R7A.
R8A	1Meg	½	01056035	BX-69	A47-1Meg-S	QJ-137	TA16L	Dumonitor
B	Shaft		Not Req.	Not Req.	FES-1	Not Req.	Not Req.	Attach to R8A.
R10A	5000Ω	½	01055803	AB-10	A47-5000-S	QJ-114	U-16	Horizontal Size
B	Shaft		Not Req.	AE-1	FKS-1/4	Not Req.	Not Req.	Attach to R10A.
	50KΩ	½	01056333	F1-S3		QJ-831 *	UF54L	Horizontal Hold (Panel)
	1. 5Meg	½		R2-S4			UR26L	▲ See Note 2 Vertical Hold (Rear)
	1Meg	½	01056034					Tone-See Note 2

Note 1. This control used in sets not equipped with phono switch.
Note 2. This control used in sets equipped with phono switch.
** Universal Replacement (Mallory Exact Duplicate Part No. UE1238).
† Saw off shaft of original control, and use coupler to obtain correct shaft length.
▲ Universal Replacement (Mallory Exact Duplicate Part No. UE1045).
♦ Concentrikit Equivalent, K-2 Kit, Base Elements And Shafts, B11-128, P6-102 (Panel)
B17-137X, R1-118 (Rear)
76-1 (Switch)
B11-123, P1-105 (Panel)
B11-135, R11-118 (Rear)
♦♦ Concentrikit Equivalent, K-5 Kit, Base Elements & Shafts, B11-129, P17-102 (Panel)
B13-137, R1-115 (Rear)
76-1 (Switch)

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: DUMONT PART No.	IRC PART No.	NOTES
R11	100Ω	½		BTS-10K	
R13	22KΩ	½		BTS-23K	
R15	620KΩ 5%	½		BTS-620K 5%	
R14	820KΩ 5%	½		BTS-820K 5%	
R15	22KΩ	½			
R16	470Ω	½		BTS-4700	
R17	100KΩ	½			
R18	4700Ω	½			
R19	100KΩ	½		BTS-100K	
R20	820Ω	½			
R21	100KΩ	½		BTS-100K	
R22	10Ω	½		BTS-10	
R23	100KΩ	½		BTS-100K	
R24	470Ω	½	03023400	BTS-470	
R25	15Meg	½	03023270	BTS-15Meg	
R26	6. 8Meg	½	03023230	BTS-6. 8Meg	
R27	1Meg	½	03023150	BTS-1Meg	
R28	1. 5Meg 5%	½	03021380	BTS-1. 5Meg	
R29	12KΩ	½	03021900		
R30	470Ω	½	03023400	BTS-470	
R31	47Ω	½	03021610	BTS-47	
R32	56KΩ	½	03041980	BTS-56K	
R33	15KΩ	½	03023490		
R34	470Ω	½	03023400	BTS-470	
R35	47KΩ	½	03034970		
R36	68Ω	½	03031730	BTS-68	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: DUMONT PART No.	IRC PART No.	NOTES
R37	56KΩ	½	03031940	BTS-56K	
R38	470Ω	½	03023400	BTS-470	
R39	39Ω	½	03031880	BTS-39	
R40	27000Ω	½	03031820	BTS-2700	
R41	180KΩ 5%	½	03031030	BTS-180K 5%	
R42	1Meg	½	03023150	BTS-1Meg	
R43	3900Ω	½	03031840	BTS-3900	
R44	5000Ω	10	03113070	PW50-5000	
R45	180Ω	½	03031000	BTS-180	
R46	5600Ω	2	03051880	BTS-5600	
R47	27Ω	½	03031580	BTS-27	
R48	1800Ω	½	03031800	BTS-1800	
R49	3900Ω	½	03031840	BTS-3900	
R50	200KΩ	½	03023540	BTS-200K	
R51	22KΩ	½	03031930	BTS-22K	
R52	27KΩ	½	03034940	BTA-27K	
R53	39KΩ	½	03031960	BTS-39K	
R54	470KΩ	½	03023200	BTS-470K	
R55	120KΩ	½	03023010	BTS-120K	
R56	100KΩ	½	03023010	BTS-100K	
R57	100Ω	½	03023420	BTS-100	
R58	220Ω	½	03031690	BTS-220	
R59	39Ω	½	03031730	BTS-390	
R60	22KΩ	½	03041930	BTS-22K	
R61	33KΩ	½	03031950	BTS-33K	
R62	10Meg	½	03032060	BTS-10Meg	

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: DUMONT PART No.	IRC PART No.	NOTES
R65	470KΩ	1	03033580	BTS-470K	
R66	470KΩ	1	03033580	BTS-470K	
R67	680Ω	2	03053440	BTS-680	
R68	330Ω	1	03034960	BTA-220	
R69	120KΩ	1	03033030	BTS-120K	
R70	68KΩ	1	03031980	BTS-68K	
R71	68KΩ	1	03031980	BTS-68K	
R72	22KΩ	2	03037930	BTS-22K	
R73	470KΩ	1	03032090	BTS-470K	
R74	470Ω	1	03031760	BTS-470	
R75	680Ω	1	03031750	BTS-680	
R76	470Ω	1	03031760	BTS-470	
R77	470KΩ	1	03032090	BTS-470K	
R78	1. 8Meg	1	03033160	BTS-1. 8Meg	
R79	2. 2Meg	1	03033620	BTS-2. 2Meg	
R80A	22KΩ	1		BTS-22K	
B	82000Ω	1	♦ 88000631	BTS-8200	
C	82000Ω	1		BTS-8200	
R81	15KΩ 5%	1	03033780	BTS-15K 5%	
R82	82KΩ	1	03034780	BTA-820	
R83	39KΩ	1	03034960	BTA-39K	
R84	47KΩ	1	03034970	BTA-47K	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: DUMONT PART No.	IRC PART No.	NOTES
R85	47KΩ	1	03034970	BTA-47K	
R86	560Ω	1	03034760		
R87	560Ω	1	03041740		
R88	100KΩ	1	03033280		
R89	10KΩ	1	03031890	BTS-10K	
R90	100KΩ	1	03033010	BTS-100K	
R91	4. 7Meg	1	03033310	BTS-4. 7Meg	
R92	680KΩ	1	03033110	BTS-680K	
R93	15KΩ 5%	1	03030750		
R94	82KΩ	1	03033060	BTS-82K	
R95	2700Ω 5%	1	03030580		
R96	100KΩ	1	03033010		
R97	100KΩ 5%	1	03030960		
R98	470Ω	1	03033400	BTS-470	
R99	15KΩ	1	03033090	BTS-15K	
R100	68KΩ	1	03033180	BTS-1. 8Meg	
R101	470KΩ	1	03033580	BTS-470K	
R102	100Ω	1	03033170	BTS-22K	
R103	3300Ω	7	03213360	PW7-3300	
R104	1500Ω	2	03037790	BTS-1500	
R105	1000Ω	1	03033420	BTS-100	
R106	2. 2Ω	1	03030730	BW1-2. 2	
R107	1300Ω	13.5	03225301		
R108	100KΩ	1	03045010	BTA-100K	

♦ Items R80A, R80B, R80C, C67A, C67B, C67C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC 1	SEC 2	SEC 3	REPLACEMENT DATA: DUMONT PART No.	Halldorson PART No.	Merit PART No.	Thordarson PART No.	Triad PART No
T1	117VAC ①	476VCT ②	5V ③	6. 3V ④	20000018	P9733	P2830	P8181	26H53
	1. 72A	.280A	6A	8. 5A				3	3

1 Parallel & phase 6. 3V windings, for secondary #3.
2 Taps 6. 3V @ 1. 25A windings.
3 Taps 5V Taps, secondary #1, use lower taps.
4 Parallel & phase 5V windings for secondary #2.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: DUMONT PART No.	Halldorson PART No.	Merit PART No.	RCA PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
					TYPE No				
T2	Horiz. Output Trans.	20009301	FB4U & RF800 *	HVO-36*	2327I *	X089 *	A-8255 *	FLY-38 *	D-35 *
T3	Vert. Output Trans.	20009322	21808	A-3029	236TI	V31S	A-8141	28H54	A-104X
T4A	Yoke-Horiz. (25MM)	89013572	DF604 ③	MDF-75		Y70F25 ③	DY-18A ③	T-18 ③	T-18 ③ ④
B	Vert. (37MM)	89013574 ①	③	③			③	③	③

① Alternate Dumont Part Number.
② Yoke rear cover & centering device.
③ Use original horizontal damping network.
④ Use original rear cover and centering device.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	9	9	9	10	1	5	3	10
	2	7	5	8	3	4	Jumper 2 & 8	8
	1	3	1	3	4	2	4	3
	7	RF800 Term #3	6	1	5	7	AGC Winding	1
	5	RF800 Term #4	2	2	7	8	AGC Winding	2
Special Notes		5					6	

③ If picture is out of phase, reverse RF800 terminals.
④ If picture is out of phase, reverse AGC winding terminals.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC	REPLACEMENT DATA: DUMONT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	6. 3KΩ	3 5Ω Tap 1. 8Ω	20009792	21000	A2900	A3880	24S80	S-51X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP	REPLACEMENT DATA: DUMONT PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	6"	PM	3. 5Ω	18003702	6A2I	22S51	① Alternate PM Speakers
	8"	PM	3. 5Ω	18003731 ①	8A2I	20S52	
	10"	PM	3. 5Ω	18003673 ①	10A3I	23S51	
	6	PM	3. 5Ω	18003701 ①	6A2I	22S61	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC	REPLACEMENT DATA: DUMONT PART No.	MEISSNER PART No.	MEBT PART No.	MILLER PART No.	NOTES
L1	VHF Ant. Matching Trans.	.6Ω	6Ω					
L2	VHF Ant. Matching Trans.	.6Ω	.6Ω					
L3	FM Trap	0Ω						
L4	VHF Ant. Coils	0Ω						
L5	VHF Ant. Shunt Coils	0Ω						
L6	VHF IF Coil	.6ΩCT						
L7	Fil. Choke	0Ω						
L8	Neut. Coil	0Ω						

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	DUMONT PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L9	Parasitic Suppressor	0Ω						Wound on 10Ω resistor
L10	VHF RF Coil	0Ω						Channel 13
L11	VHF RF Coils	0Ω						
L12	UHF IF Coil	0Ω						
L13	RF Coil	0Ω						
L14	VHF Mixer Grid Coil	0Ω						Channel 13
L15	VHF Mixer Grid Coils	0Ω						
L16	UHF IF Coil	0Ω						
L17	VHF Osc. Coil	0Ω						Channel 13
L18	VHF Osc.Coils	0Ω						
L19	VHF Osc. Coil	0Ω						Channel 6
L20	Conv. Plate	.2Ω	.1Ω					
L21A	41.25MC Trap	.1Ω						
B	47.25MC Trap	.1Ω		21013771				
L22	1st Video IF	.1Ω		20009851				Tapped
L23	Fil. Choke	0Ω		21011762	19-1001		4604	1.5 Microhenries
L24	2nd Video IF	.1Ω	.1Ω	20008991	17-4524	TV-130	6219	
L25	Fil. Choke	0Ω		21011762	19-1001		4604	1.5 Microhenries
L26	3rd Video IF	.1Ω	.1Ω	20008991	17-4522	TV-130	6219	
L27	Fil. Choke	0Ω		21011762	19-1001		4604	1.5 Microhenries
L28	4th Video IF	.1Ω	.1Ω	20008991	17-4524	TV-130	6219	
L29	Series Peaking Coil	4.8Ω		21012451			4626	27 Microhenries
L30	Shunt Peaking Coil	9.3Ω		21006628	19-4201	TV-184	6154	197 Microhenries
L31	Series Peaking Coil	6.8Ω		21006622	19-3100	TV-181	6177	110 Microhenries
L32	4.5MC Trap	4.1Ω		21013781	20-1004	TV-151	1469	
L33	Shunt Peaking Coil	6.8Ω		21006622	19-3100	TV-181	6177	110 Microhenries
L34	Series Peaking Coil	8.7Ω		21013861	19-3160		6120	152 Microhenries
L35	Sound IF	1.7Ω		21013791	20-1004	TV-151	1469	
L36	Ratio Det.	5Ω	.8ΩCT	20009043	17-3497 *	TV-115 *	6205 *	Tertiary Winding=.7Ω
L37	RF Choke	6.1Ω		21006550	19-1005		4612	8.2 Microhenries, IRC Part No. CL-1
L38	RF Choke	2.8Ω		21006520	19-1003		4608	4.7 Microhenries, IRC Part No. CL-1

* Use adaptor plate.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI.	SEC.	DUMONT PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L39	55Ω		21010991	19-1576	TV-163	6210			HS-5	

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	DUMONT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L40	.280ADC	38.5Ω	1.19HY	21010955	C5037	C2996	C2326 ①	26C44 ①	C-17X

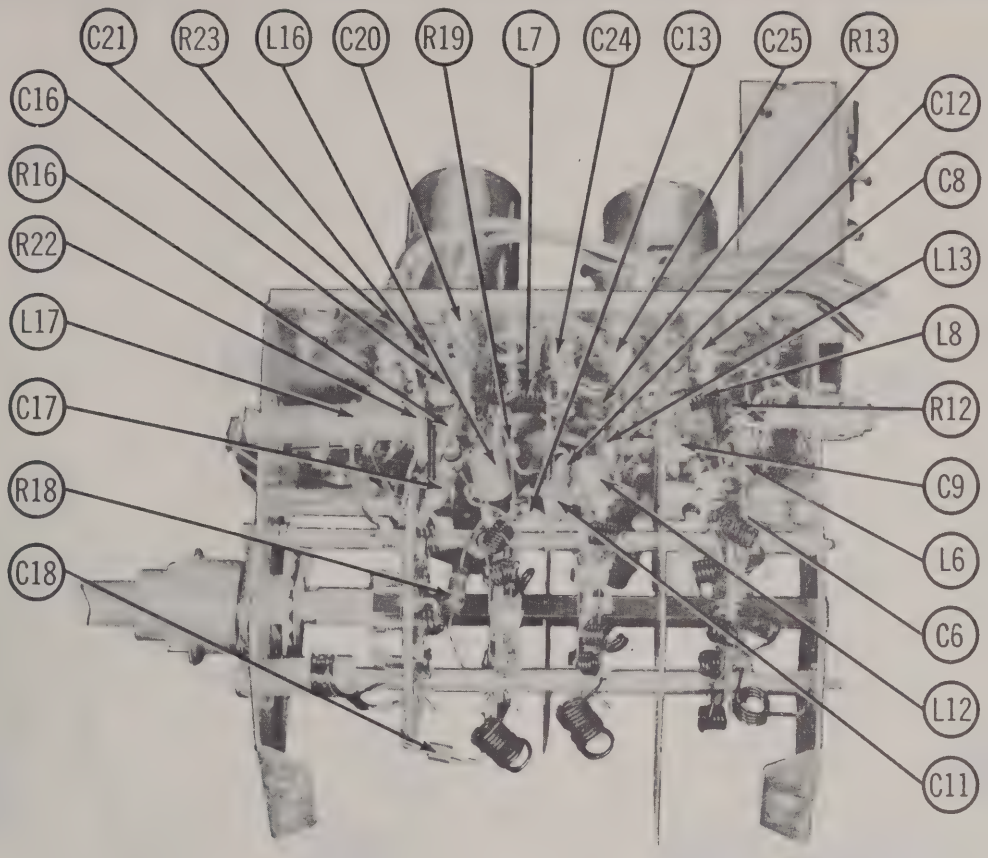
① Drill one new mounting hole.

FUSES

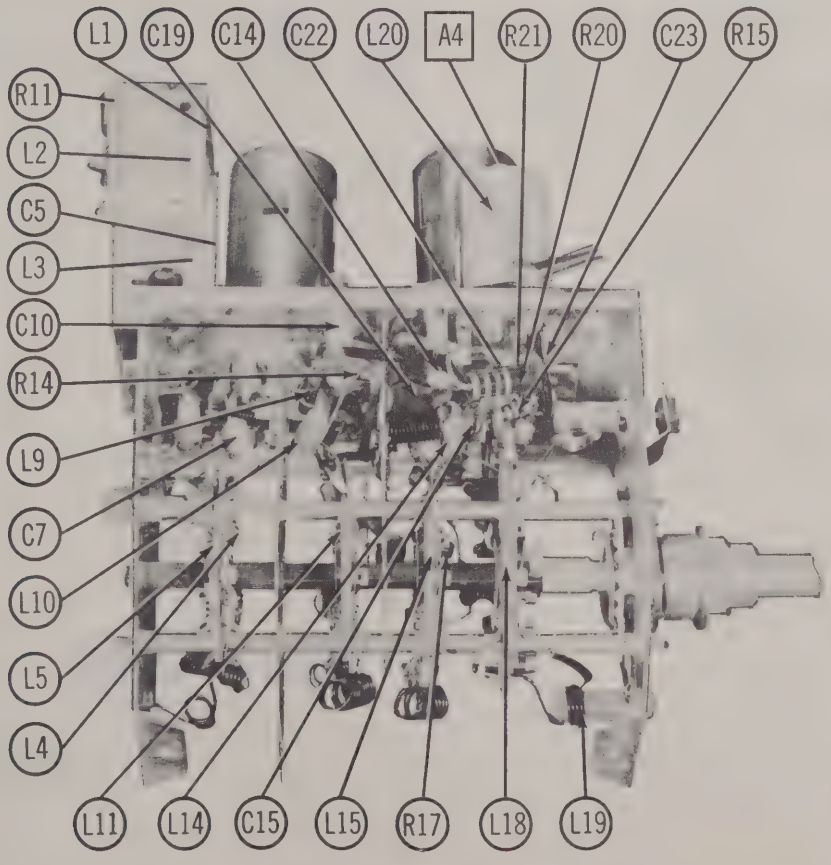
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			DUMONT PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	3/4A 250V	11005230	13110001	313.750 (3AG S/B 3/4A)	357001	MDL 3/4	4405

MISCELLANEOUS

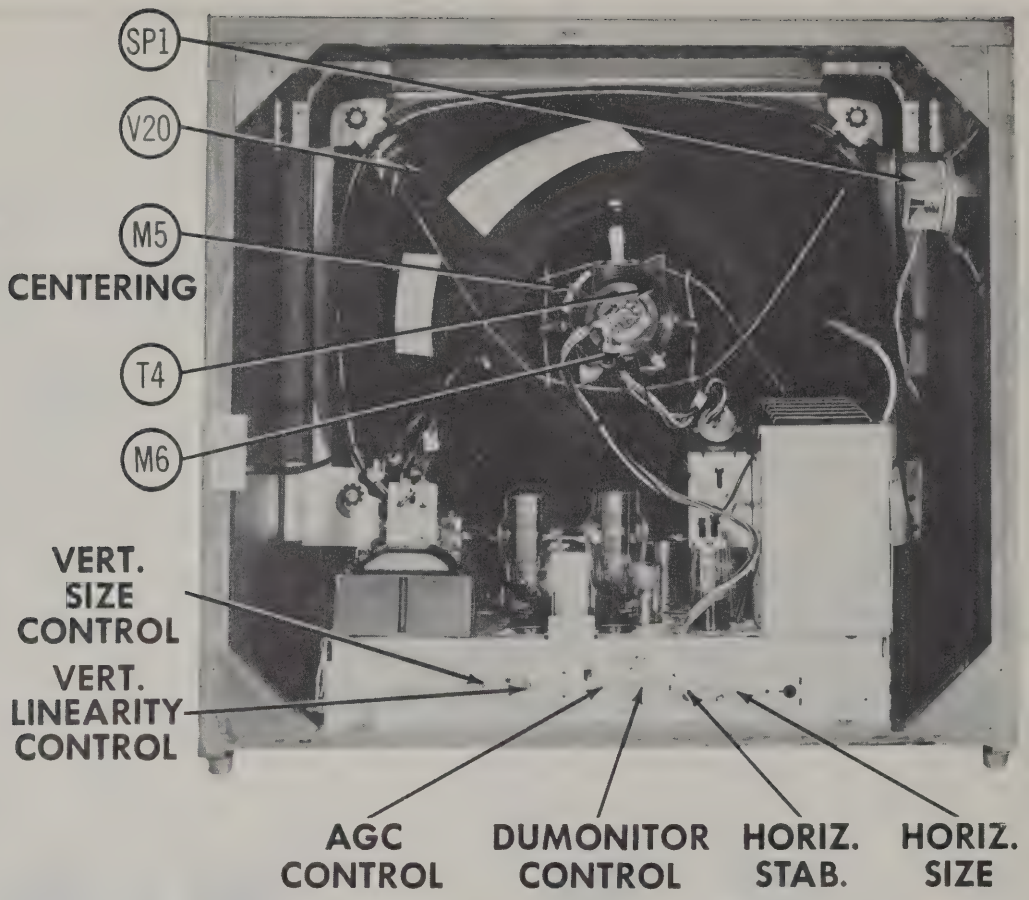
ITEM No.	PART NAME	DUMONT PART No.	NOTES
M2	Tuner	89013751	VHF-Ch. RA-350-Not used in all versions.
	Tuner	89013553	VHF-Ch. RA-350-Not used in all versions.
M3	Tuner		UHF-VHF Combination-Ch. RA-351, May consist of either VHF Tuner Part No. 89013751 or 89013553 with UHF Tuner Part No. 89013771.
M4	Trap	88000733	VHF Ant. Input Filter-Ch. RA-351
M5	Centering Device	29000771	Includes Deflection Yoke (T4) Rear Cover
M6	Ion Trap	29000663	
	Knob	45006463	Fine Tuning-Ch. RA-351, Cabot, Carlisle, Carol, Taft, & Tarkington Models.
	Knob	45005963	Fine Tuning-Ch. RA-350, Bronze Gold, Tabor & Talbot Models
	Knob	45005964	Fine Tuning-Ch. RA-350, Light Gold, Tabor & Talbot Models
	Knob	45005966	Fine Tuning-Ch. RA-351, Clear, Tabor & Talbot Models
	Knob	45006461	Fine Tuning-Ch. RA-350, Cabot, Carlisle, Carol, Taft, & Tarkington Models
	Knob	45005973	Brightness-Ch. RA-350, Bronze Gold, Tabor & Talbot Models
	Knob	45005974	Brightness-Ch. RA-350, Light Gold, Tabor & Talbot Models
	Knob	45005975	Brightness-Ch. RA-351, Clear, Tabor & Talbot Models
	Knob	45006462	Brightness-Cabot, Carlisle, Carol, Taft & Tarkington Models
	Knob	45006491	Channel Selector-Bronze Gold, Tabor & Talbot Models
	Knob	45006495	Channel Selector-Light Gold, Tabor & Talbot Models
	Knob	45006451	Channel Selector-Cabot, Carlisle, Carol, Taft & Tarkington Models
	Knob	45006492	On-Off-Volume-Bronze Gold, Tabor & Talbot Models
	Knob	45006496	On-Off-Volume-Light Gold, Tabor & Talbot Models
	Knob	45006452	On-Off-Volume-Cabot, Carlisle, Carol, Taft, & Tarkington Models



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET—REAR VIEW

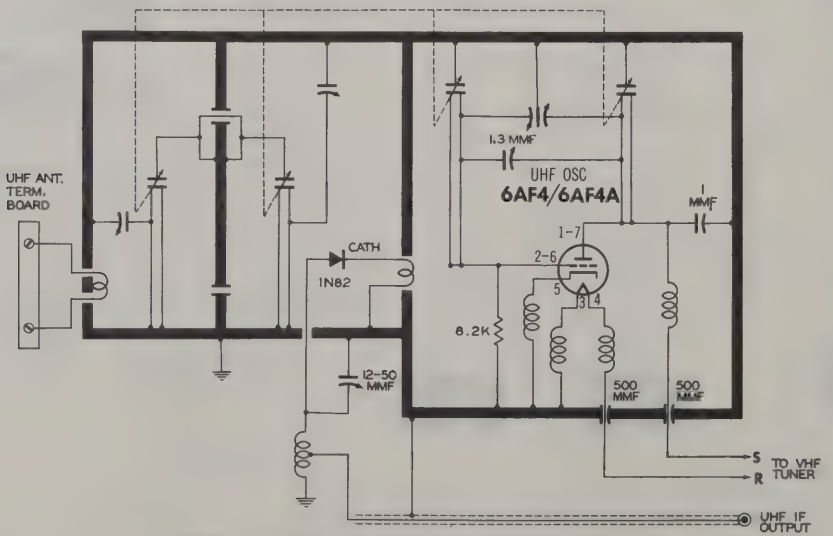
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station, preferably with a test pattern.

2. Set the horizontal hold control to its mid-range position.

3. Adjust the horizontal stabilizer slug (B1) to the center of its effective synchronizing range, then momentarily remove signal by switching off channel and back again. Picture should pull into sync. If not, readjust B1 slightly until picture pulls into sync.

4. Adjust the horizontal size control for a picture slightly wider than is necessary to fill the picture mask horizontally.



UHF TUNER PART NO. 89013771 USED WITH CHASSIS RA-351

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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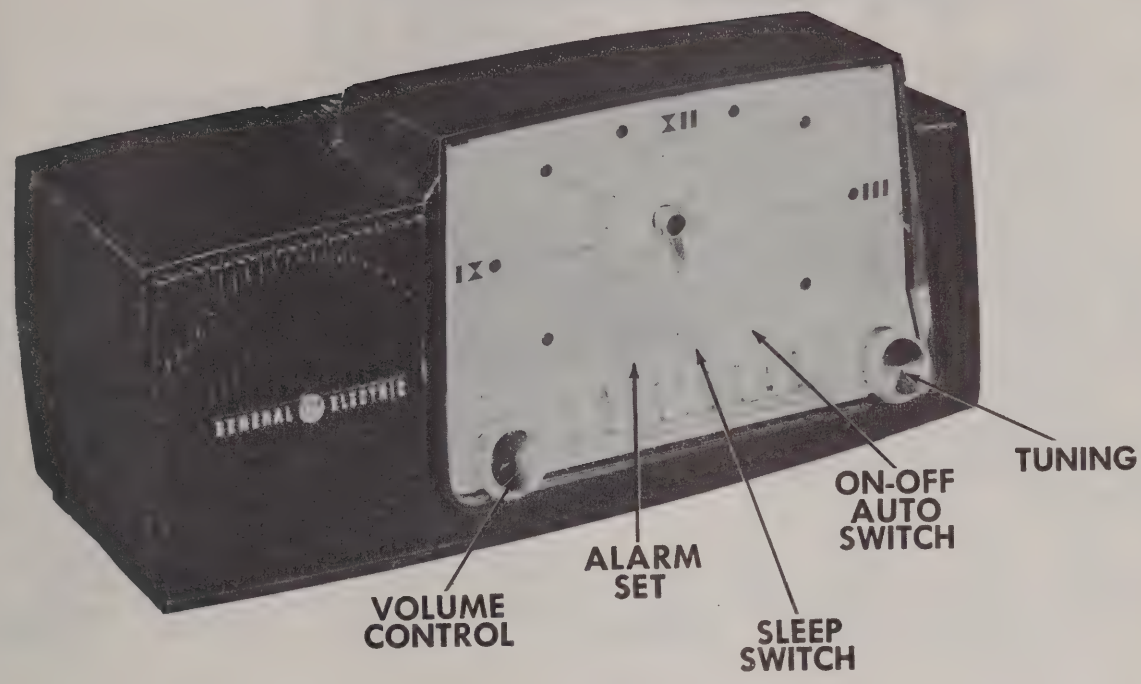
UHF TUNER SCHEMATIC

GENERAL ELECTRIC
MODELS 911, 912, 913



GENERAL ELECTRIC
MODELS 911, 912, 913

TRADE NAME	General Electric Models 911, 912, 913
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N. Y.
TYPE SET	AC Operated AM Superheterodyne Receiver with Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles
RATING	.24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1500KC	Tune to 1500KC signal	"	A6	Adjust for maximum output while rocking tuning gang.

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3924 MEADE ST.
DENVER, COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		General Electric PART No.	STANDARD REPLACEMENT	
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	12AV6	
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Genrral Electric PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	RCE-149	PRS150V5050	BBRD5515	TCD49	TDL-D50-150	MTD-1550	TVA-2453
B	50	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.05	200	UCC-011	BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C3	47		RCW-3075	SI47	DD-470	G033	831-470	UC-5447	5GA-Q47	
C4	220			SI220	DD-221	G051	811-221	UC-5322	5GA-T22	Note 1
C5A	400		♦ RCW-3207	♦ PA-408	D6-401	G058	811-391	UC-5339	5GA-T39	Note 1
B	2000				DD-202	K072	801-002	DC-522	5HK-D2	
C	220				DD-221	G051	811-221	UC-5322	5GA-T22	
D	5000				DD-502	K080	811-005	DC-525	5HK-D5	
C6	.022	600	RCN-050	BPD-02	DD-203	CUB6S22	817-02	PT6122	6TM-S22	
C7	.047	600	RCN-053	BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C8	.05	400	UCC-045	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	

Note 1. When C4 is used, C5A (lead 3 of C-R unit) is removed.
♦ Items C5A, C5B, C5C, C5D, R6A, R6B and R6C are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	General Electric PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	RRC-327	ABT-71	A47F5-1Meg	QVC-539X	UT-443	Volume Tap at 500KΩ
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	General Electric PART No.	IRC PART No.	
R2	22KΩ	½		BTS-22K	
R3	110Ω 5%	½		BTS-110 5%	
R4	2.2Meg	½		BTS-2.2Meg	
R5	68Ω	½		BTS-68	

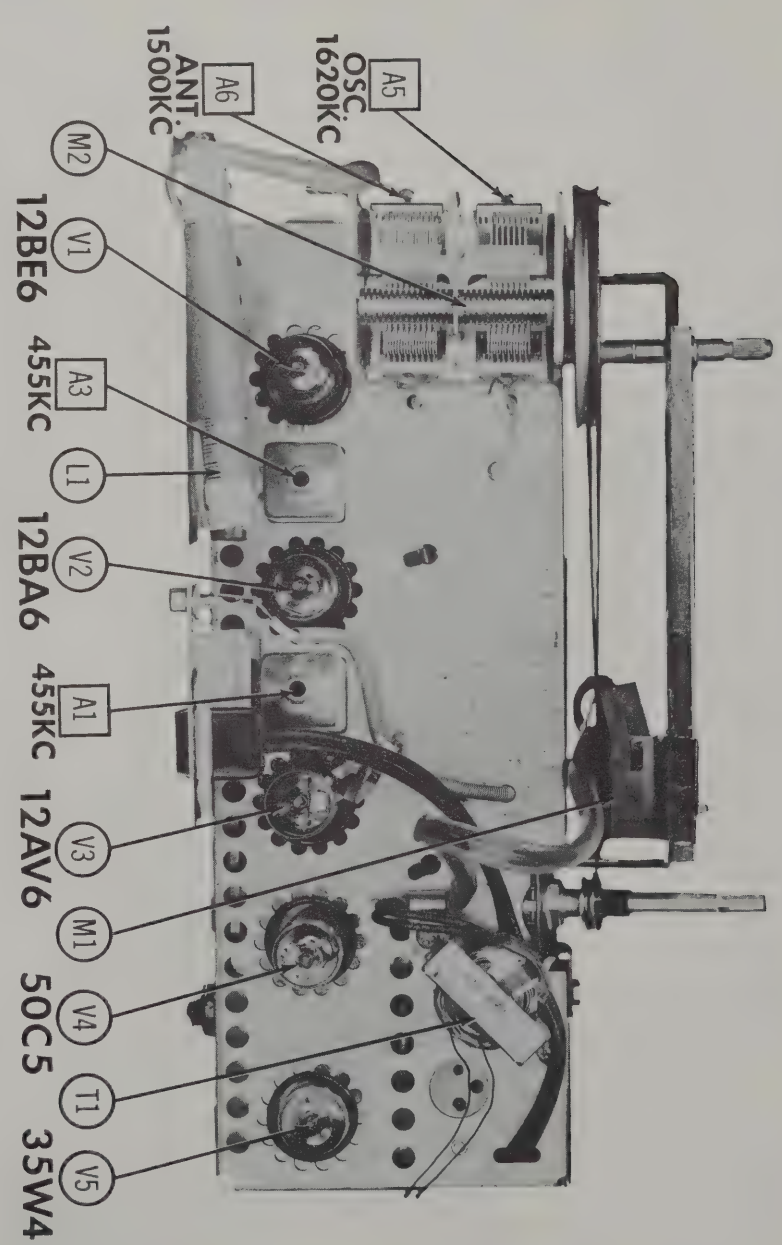
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	General Electric PART No.	IRC PART No.	
R6A	6.8Meg		♦ RCW-3207	BTS-6.8Meg	
B	470KΩ			BTS-470K	
C	470KΩ			BTS-470K	
R7	1500Ω	2		BTB-1500	
R8	150Ω	½		BTS-150	
R9	18Ω	½		BTS-18	

♦ Items R6A, R6B, R6C, C5A, C5B, C5C, C5D are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	General Electric PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.5KΩ	3.8Ω	RTO-138	Z1102 ①	A3031 ①	A3336	24S50A ①	S-16X ①	① Drill one new mtg. hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

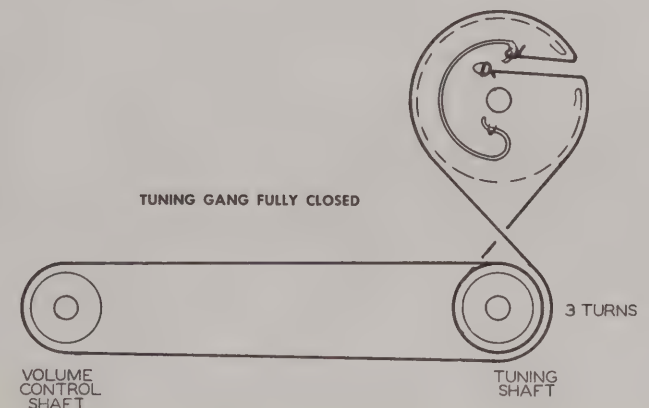
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	General Electric PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3.4 Ω	ROP-033	4A07	223S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.5Ω		RLL-062				
L2	Osc. Coil	.6Ω	6.5Ω	RLC-122	14-1074	BC-394	70-Osc.	
L3	Input IF	30Ω	30Ω	RTL-163	16-6780	BC-352	12-C1	
L4	Output IF	30Ω	30Ω	RTL-163	16-6780	BC-353	12-C2	

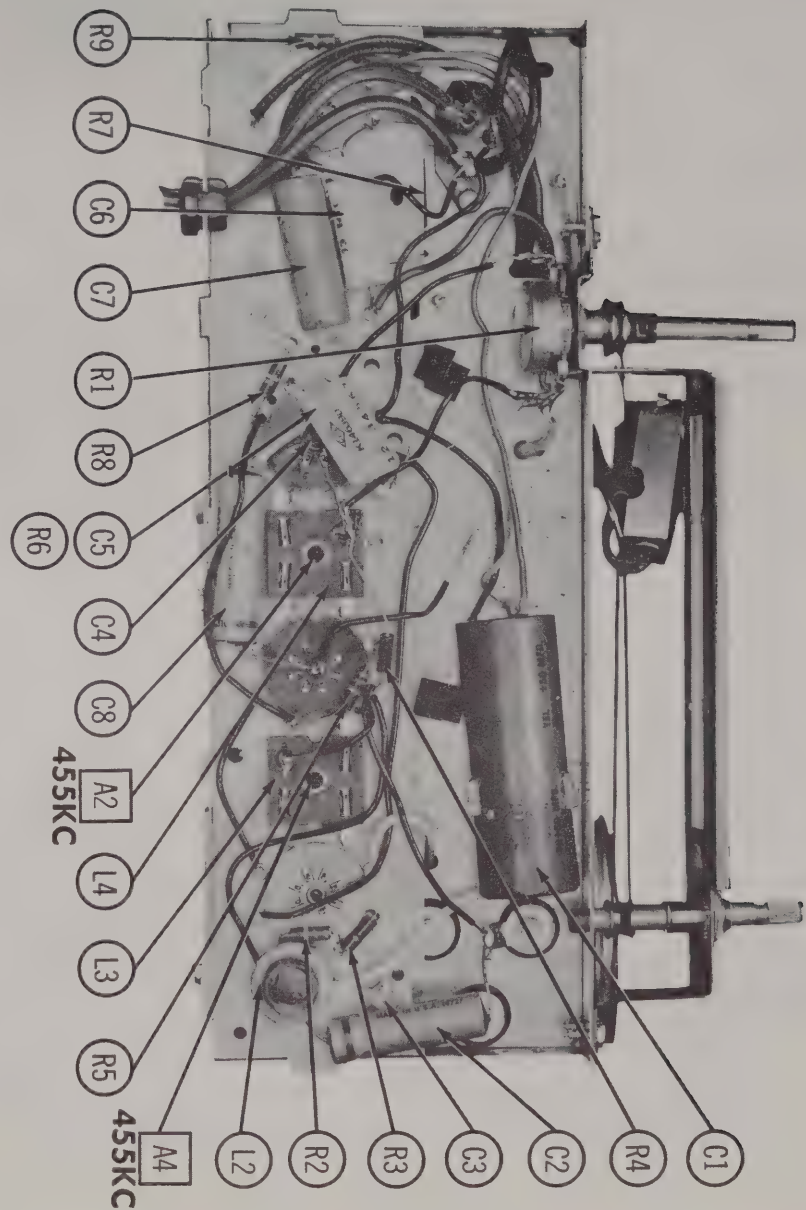
MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M1	Dial Light		#44
M2	Tuning Cap.	RCT-094	2 Gang (20-315MMF, 24-150MMF)
M3	Clock Assy.	RZC-056	Model 911
	Clock Assy.	RZC-057	Models 912, 913
	Cabinet	RAC-168	Model 911
	Cabinet	RAC-169	Model 912
	Cabinet	RAC-170	Model 913
	Knob	RDK-425	Volume & Tuning
	Knob	RZK-017	Clock
	Dial Scale & Clock Crystal	RDW-097	Model 911
	Dial Scale & Clock Crystal	RDW-098	Models 912, 913
	Translucent Window	RDW-099	
	Dial Pointer	RDP-088	

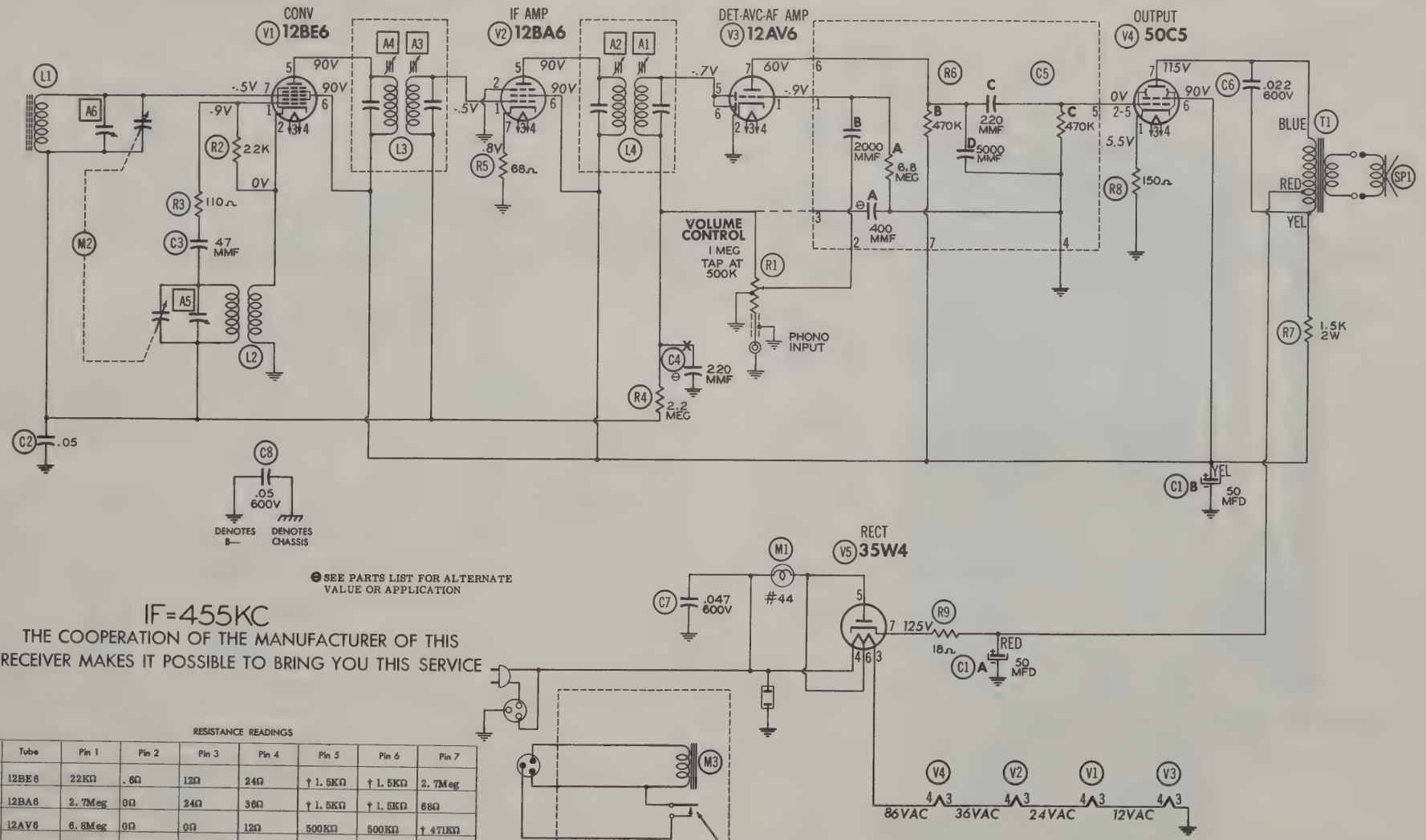


DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



GENERAL ELECTRIC
Model 911



SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.6Ω	12Ω	24Ω	† 1.5KΩ	† 1.5KΩ	2.7Meg
V 2	12BA6	2.7Meg	0Ω	24Ω	36Ω	† 1.5KΩ	† 1.5KΩ	68Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	500KΩ	500KΩ	† 471KΩ
V 4	50C5	150Ω	470KΩ	36Ω	86Ω	470KΩ	† 1.5KΩ	† 248Ω
V 5	35W4	NC	TP	86Ω	121Ω	116Ω	116Ω	60KΩ

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED.
† MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.
TP-TIE POINT.

THROUGH CAMS AND LINKAGES, ONE SW. PERFORMS ALL FUNCTIONS OF OFF, ON, AUTO, AND SLEEP.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

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HOFFMAN MODELS 7B170, U, 7B182P, P2, 7M169, U, 7M181P, P2, 7W181P, 21B173, U, 21B176, S, U, 21B184, U, 21B185P, 21B188, U, U2, 21B191, C2, U, U2, 21B358, P, U, 21B360, 21B361U, U2, 21K186, U, U2, 21M172, U, 21M175, S, U, 21M183, P, U, 21M184P, 21M187, U, U2, 21M190, C2, U, U2, 21M357, P, U, 21M360, U, U2, 21P177, S, U, 21P185, 21P192, C2, U, U2, 21P359, P, U, 21P362, U, U2, 21U205S, U, 21W190, C2, U, U2, 21W360, U, U2, 21-189, U, U2 (Ch. 303-17, -21, 306-21, -21B, -21U, 307-21, 308-21, 309-21, -21U, -21U2, 309A-21, -21U, 310-21, -21C2, -21U, -21U2)

HOFFMAN MODEL 21M190

TRADE NAME	Hoffman	MODELS	CHASSIS
		7B170, 7M169	303-17
		7B170U, 7M169U	303-17U
		21B173, 21B176, 21M172, 21M175, 21P177	303-21
		21B173U, 21B176U, 21M172U, 21M175U, 21P177U	303-21U
		21B176S, 21B184, 21B358, 21M175S, 21M183, 21M357, 21P177S, 21P185, 21P359	306-21
		21B176SU, 21B184U, 21B358U, 21M175SU, 21M183U, 21M357U, 21P177SU, 21P359U	306-21U
		21U205S	306-21B
		21U205SU	306-21BU
		7B182P, 7B182P2, 7M181P, 7M181P2, 7W181P	307-17
		21B185P, 21B358P, 21M183P, 21M184P, 21M357P, 21P359P	308-21
		21-189, 21B188, 21K186, 21M187	309-21
		21-189U, 21B188U, 21K186U, 21M187U	309-21U
		21-189U2, 21B188U2, 21K186U2, 21M187U2	309-21U2
		21B360, 21M360, 21P362, 21W360	309A-21
		21B361U, 21M360U, 21P362U, 21W360U	309A-21U
		21B361U2, 21M360U2, 21P362U2, 21W360U2	309A-21U2
		21B191, 21M190, 21P192, 21W190	310-21
		21B191C2, 21M190C2, 21P192C2, 21W190C2	310-21C2
		21B191U, 21M190U, 21P192U, 21W190U	310-21U
		21B191U2, 21M190U2, 21P192U2, 21W190U2	310-21U2

MANUFACTURER	Hoffman Radio Corp., 6200 S. Avalon Blvd., Los Angeles 3, Calif.
TYPE SET	Television Receiver
TUBES	Twenty
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.34 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 1
Horizontal Sweep Circuit Adjustments 18
Parts List and Descriptions 12, 13, 14
Photographs
- Cabinet-Rear View 18
- Capacitor Identification 3, 10
- Chassis-Top View 15
- RF Tuner 18
- Resistor Identification 4, 9

Photographs (Cont)
- Trans., Inductor & Alignment Identification 15

Resistance Measurements 8
Servicing in the Field 1
Schematic (Alternate Tuners) 11, 16, 17
Schematic (TV) 2
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

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PROPERTY OF L. F. ELMENDORF 3211 MADE ST. DENVER, COLORADO

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

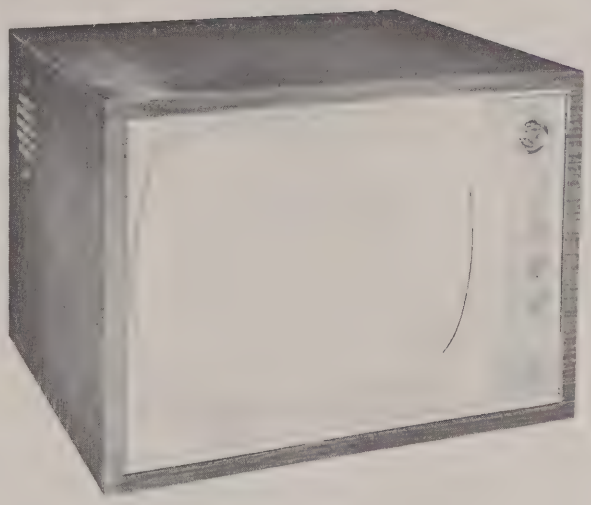
DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 6 push-on type control knobs from front panel of cabinet.
2. Remove 1 metal screw and loosen 7 wood screws. Remove rear cover.
3. Place receiver on its side (speaker up).
4. Remove 3 chassis bolts below chassis mounting board screen.
5. Restore receiver to its normal upright position.
6. Remove 4 wood screws from chassis rear (holding chassis to cabinet) wing nut bolt from top of tuner.
7. Remove wing nut from yoke and remove yoke.
8. Remove chassis.
9. Remove 2 speaker nuts. Remove speaker.

CABINET REMOVAL

1. Remove 6 push-on type control knobs from panel of cabinet.
2. Remove 1 metal screw and loosen 7 wood screws. Remove rear cover.
3. Place receiver on its side (speaker up).
4. Disconnect speaker leads.
5. Remove 6 bolts from bottom sides (3 on each side) and 2 wood screws from bottom front. Restore receiver to its normal upright position.
6. Remove 4 wood screws from chassis rear (holding chassis to cabinet.).
7. Slide cabinet to the front and off.
8. Remove 2 speaker nuts. Remove speaker.



CHASSIS

303-17, U, 303-21, U, 306-21, B, U, BU, 307-21, 308-21, 309-21, U, U2, 309A-21, U, U2, 310-21, C2, U, U2

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet above the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 3 wood screws holding metal strip at the top edge of the safety glass. Remove strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

SPECIAL ADJUSTMENTS - Area Control Adjustment

The area control (R5) is located on the rear panel of the chassis. Adjust R5 for MINIMUM snow in picture.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Adjust the horizontal frequency slug of L23 until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary slug (A3) located on top of chassis.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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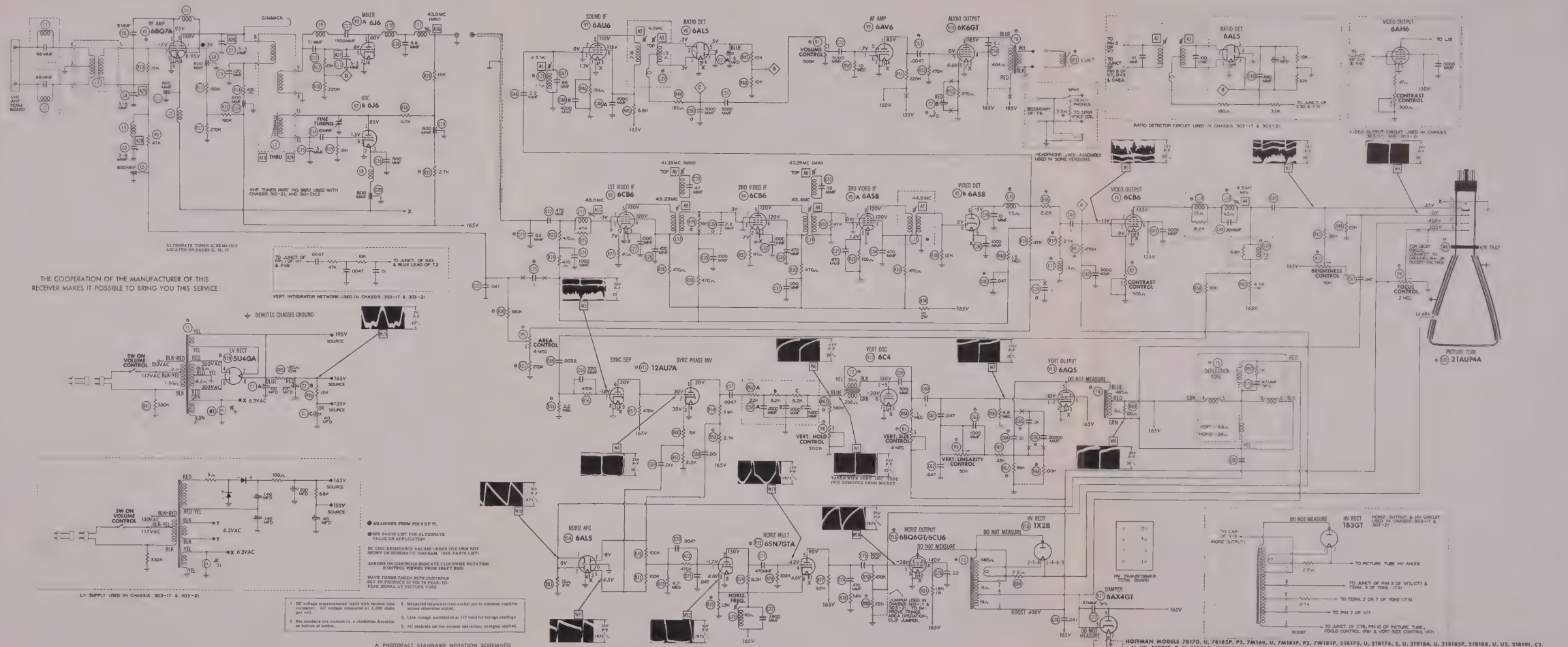
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
ALTERNATE TUNER SCHEMATICS LOCATED ON PAGES 15, 16, 17.
VERT INTEGRATOR NETWORK USED IN CHASSIS 303-17 & 303-21
DENOTES CHASSIS GROUND
LV SUPPLY USED IN CHASSIS 303-17 & 303-21
VHF TUNER PART NO. 8857 USED WITH CHASSIS 310-21, AND 303-21C,21
RATIO DETECTOR CIRCUIT USED IN CHASSIS 303-17 & 303-21
VIDEO OUTPUT CIRCUIT USED IN CHASSIS 303-17, AND 303-21
HEADPHONE JACK ASSEMBLY USED IN SOME VERSIONS
TAKEN WITH VERT. OSC. TUBE (V17) REMOVED FROM SOCKET
HORIZ. OUTPUT & HV. CIRCUIT USED IN CHASSIS 303-17 & 303-21
◆ MEASURED FROM PIN 8 OF V1.
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1 DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2 Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.
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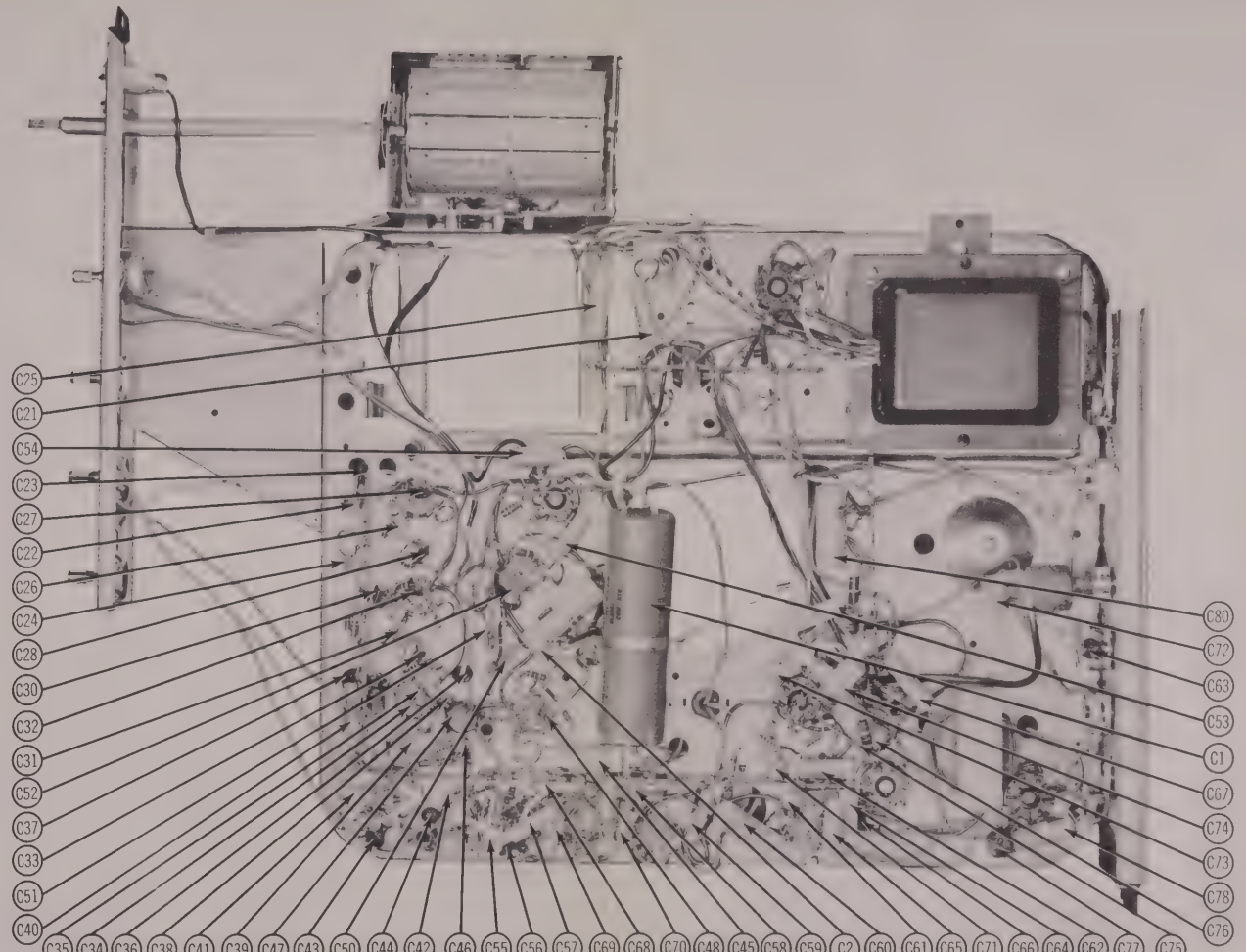
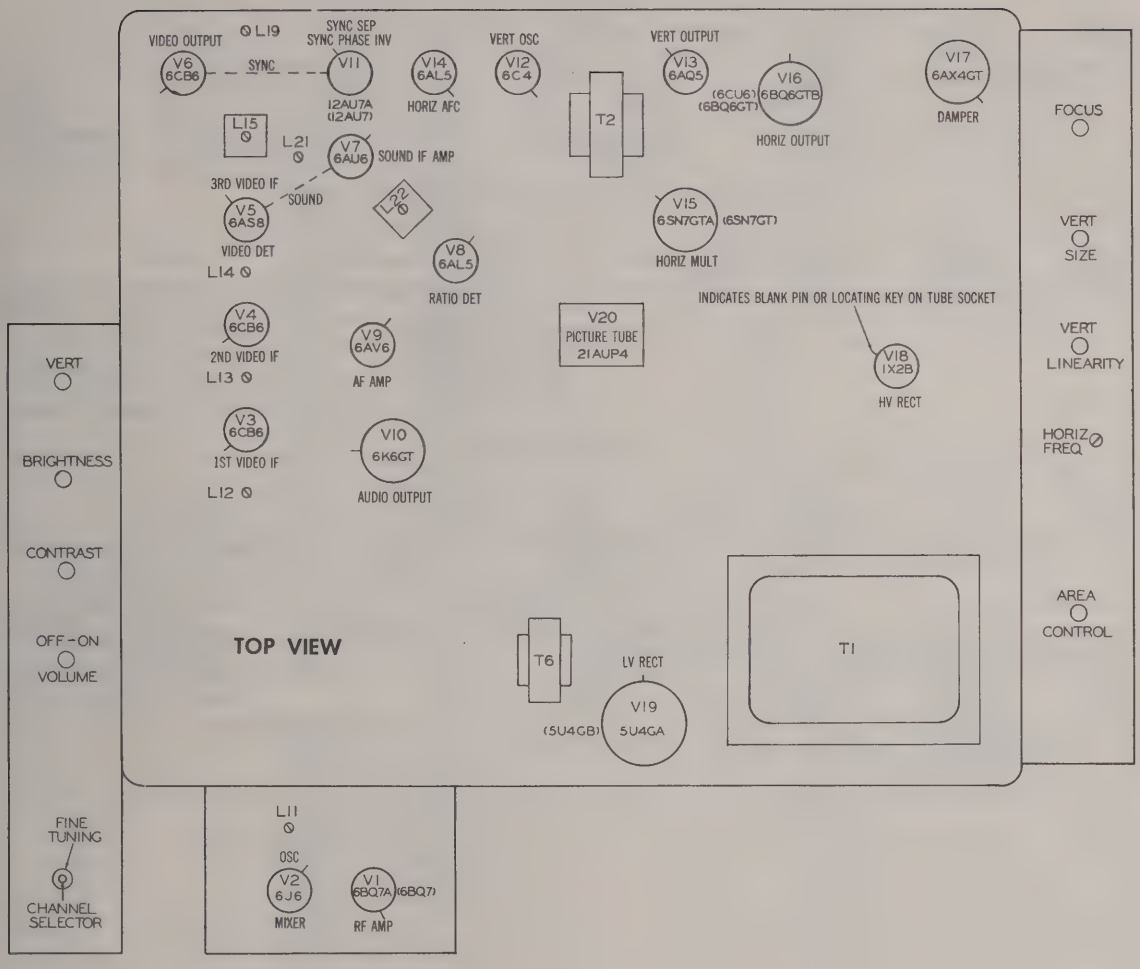
HOFFMAN MODELS 7B17O, U, 7B18P, P2, 7M169, U, 7M181P, P2, 7W181P, 21B173, U, 21B176, S, U, 21B184, U, 21B185P, 21B188, U, U2, 21B191, C2, U, U2, 21B358, P, U, 21B360, 21B361U, U2, 21K186, U, U2, 21M172, U, 21M173, S, U, 21M183, P, U, 21M184P, 21M187, U, U2, 21M190, C2, U, U2, 21M172, U, 21M175, S, U, 21M183, P, U, 21M184P, 21M187, U, U2, 21M190, C2, U, U2, 21M357, P, U, 21M360, U, U2, 21P177, S, U, 21P185, 21P192, C2, U, U2, 21P359, P, U, 21P362, U, U2, 21U2035S, U, 21W190, C2, U, U2, 21W360, U, U2, 21-189, U, U2 (Ch. 303-17, -21, 306-21, -21B, -21U, 307-21, 308-21, 309-21, -21U, -21U2, 309A-21, -21U, 310-21, -21C2, -21U, -21U2)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

SET 312 FOLDER 6

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V19**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V20**
Has pic, no sound - **V7, V8, V9, V10**

SYNC FAILURE
No vert. sync - **V11, V12**
No horiz. sync - **V11, V14, V15**
No vert. or horiz. sync - **V11**

SWEEP FAILURE
No raster, has sound - **V15, V16, V17, V18, V20**
No vertical deflection - **V12, V13**
Poor vert. linearity or foldover - **V12, V13**
Poor horiz. linearity or foldover - **V15, V16, V17**
Narrow picture - **V15, V16, V17, V18, V19**
Vert. off freq. - **V11, V12**
Horiz. off freq. - **V11, V14, V15**

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Switch the tuner between any two channels so that the detent roller sets on one of the high points of the drum disc. This will disable the local oscillator and reduce the possibility of erroneous indications.
Do not remove V15 to eliminate the high voltage shock hazard.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru 10KΩ to point Ⓑ. Common to chassis.	A1, A2	Attenuate signal level to obtain 5 volts on VTVM. Adjust for maximum deflection.
2.	"	"	"	"	DC probe to point Ⓒ. Common to chassis.	A3	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 1 and 2 until readings do not change.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. thru 10KΩ to point Ⓑ. Low side to chassis.	A1, A2	Disconnect stabilizing capacitor C2A. Adjust A1 and A2 for curve of maximum amplitude and symmetry similar to Fig. 1.
2.	"	"	"	"	"	Vert. Amp. thru 10KΩ to point Ⓒ. Low side to chassis.	A3	Reconnect stabilizing capacitor C2A. Adjust so that 4.5MC occurs at crossover lines as in Fig. 2. SLIGHTLY retouch A2 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

Turn the contrast control fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
3.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to pin 11 of picture tube thru detector (Fig. 3). Common to chassis.	A4	Adjust for MINIMUM deflection.

VIDEO IF ALIGNMENT

Turn the contrast control fully clockwise. Connect the negative lead of a 3 volt battery to the ungrounded side of C40. Connect the positive lead to chassis. Attenuate generator output as low as possible to obtain readings.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	Direct	High side to ungrounded tube shield floating over converter tube (V2). Low side to chassis.	41.25MC (Unmod.)	Between any two channels	DC probe to point Ⓐ. Common to chassis.	A5	Adjust for MINIMUM deflection.
5.	"	"	47.25MC	"	"	A6	"
6.	"	"	44.0MC	"	"	A7	Adjust for maximum deflection.
7.	"	"	45.4MC	"	"	A8	"
8.	"	"	43.25MC	"	"	A9	"
9.	"	"	43.0MC	"	"	A10	Adjust A10 for MINIMUM deflection.
10.	"	"	43.0MC	"	"	A11	Adjust for maximum deflection.
11.	"	"	45.0MC	"	"	A10	Readjust A10 for maximum deflection. Repeat steps 4 thru 11 until readings do not change.

OVERALL VIDEO IF RESPONSE CHECK

Connect a .001MFD capacitor across the vertical input terminal on scope. Connect bias as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Direct	High side to ungrounded tube shield floating over converter tube. Low side to chassis.	43.5MC (10MC Swp.)	41.25MC 42.5MC 45.75MC 47.25MC	Set channel selector between any two channels	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Check for response curve similar to Fig. 4. Use high scope gain and sweep generator output. Remove bias battery to view trap markers. If necessary, retouch A7 thru A11 for desired response. Bandpass should be approximately 3.25MC. Adjust A8 to place 45.75MC at 50% on response curve. Adjust A9 to place 42.5 at 50% on low frequency side of response curve. Adjust A7 to eliminate tilt on response curve. If necessary, SLIGHTLY retouch A5 and A6 to place 41.25MC and 45.75MC markers in trap notch as in Fig. 4.

FIG. 1

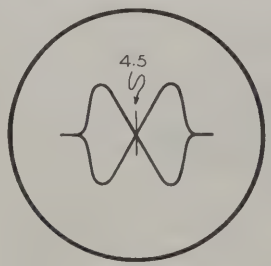


FIG. 2

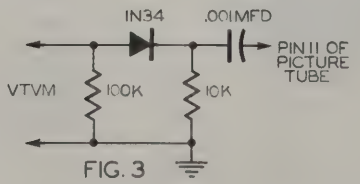


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT

Complete oscillator alignment may not be necessary in tuners 9858, 9838, 9829 and 9843. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels, it may be possible to correct them in one step using A12. It should be noted that this is an all channel adjustment and should not be used to correct any individual channel. If adjustment of A15 will not bring all channels well within the range of the fine tuning control (in the above tuners) it will be necessary to adjust the channel strip adjustment screw for each channel that is off frequency. Leave bias connected as under "Video IF Alignment".
The channel oscillator adjustment screws are reached through a hole just to the right of the channell selector switch shaft.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across VHF antenna termianls with 120Ω in each lead.	213MC (10MC Swp.)	211. 25MC 215. 75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A13	Adjust to place sound marker in trap notch as shown in Fig. 5. Video marker should be at 50%.
			207MC (10MC Swp.)	205. 25MC 209. 75MC	12		A14	
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11		A15	
			195MC (10MC Swp.)	193. 25MC 197. 75MC	10		A16	
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9		A17	
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8		A18	
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7		A19	
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6		A20	
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5		A21	
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4		A22	
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3		A23	
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2		A24	

VHF RF AND MIXER ALIGNMENT

Leave bias connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	207MC (10MC Swp.)	205. 25MC 209. 75MC	12	Vert. Amp. thru 10KΩ to point (D). Low side to chassis.	A25, A26, A27	Adjust for response curve similar to Fig. 6 with markers above 90%.
15.	"	"	213MC (10MC Swp.)	211. 25MC 215. 75MC	13	"		If markers fall below 70% on any one channel, make compromise adjustments of A25, A26, and A27 with channel selector set to that channel. Check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11			
			195MC (10MC Swp.)	193. 25MC 197. 75MC	10			
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2			

43.5MC TRAP ALIGNMENT

Adjust the 43.5MC trap adjustment A28 for MINIMUM interference on channel 2.

UHF TUNER ALIGNMENT

The UHF portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

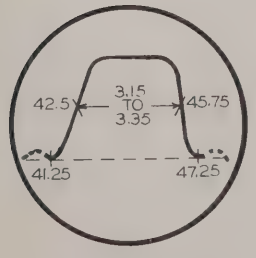


FIG. 4

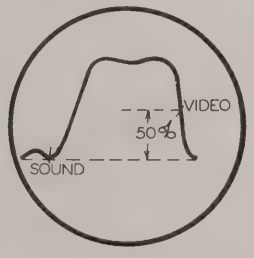


FIG. 5

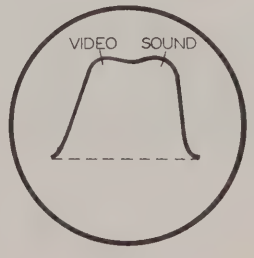


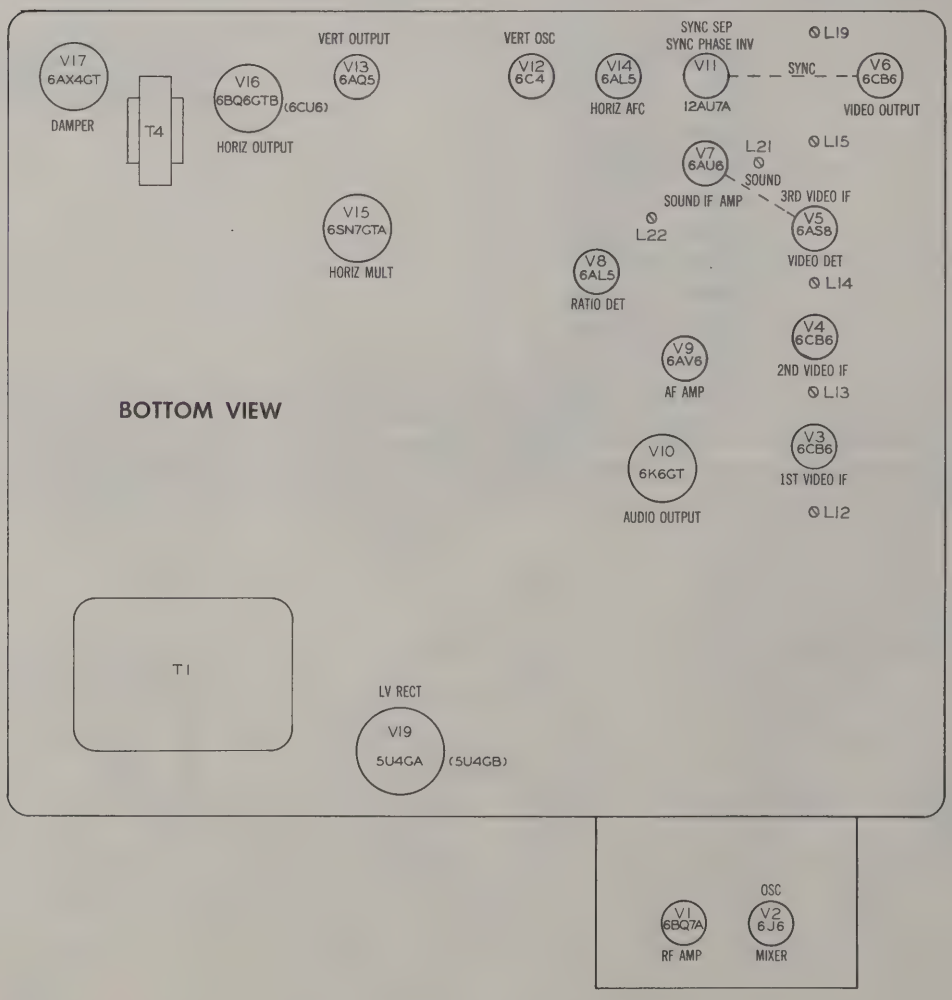
FIG. 6

HOFFMAN MODELS 7B17O, U, 7B182P, P2, 7M169, U, 7M181P, P2, 7W181P, 21B173, U, 21B176, S, U, 21B184, U, 21B185P, 21B188, U, U2, 21B191, C2, U, U2, 21B358, P, U, 21B360, 21B361U, U2, 21K186, U, U2, 21M172, U, 21M175, S, U, 21M183, P, U, 21M184P, 21M187, U, U2, 21M190, C2, U, U2, 21M357, P, U, 21M360, U, U2, 21P177, S, U, 21P185, 21P192, C2, U, U2, 21P359, P, U, 21P362, U, U2, 21U205, U, 21W190, C2, U, U2, 21W360, U, U2, 21-189, U, U2 (Ch. 303-17, -21, 306-21, -21B, -21U, 307-21, 308-21, 309-21, -21U, -21U2, 309A-21, -21U, 310-21, -21C2, -21U, -21U2)

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	1Meg	0Ω	.1Ω	0Ω	† 600Ω	220KΩ	INF	0Ω
V 2	6J6	† 7.5KΩ	† 18KΩ	.1Ω	0Ω	235KΩ	10KΩ	0Ω		
V 3	6CB6	1.5Meg	47Ω	.1Ω	0Ω	† 1.6KΩ	† 1.6KΩ	0Ω		
V 4	6CB6	1.5Meg	47Ω	.1Ω	0Ω	† 1.6KΩ	† 1.6KΩ	0Ω		
V 5	6AS8	† 1.6KΩ	.1Ω	150Ω	0Ω	.1Ω	5KΩ	0Ω	.1Ω	† 1.6KΩ
V 6	6CB6	470KΩ	110Ω	0Ω	.1Ω	† 4.8KΩ	† 12KΩ	110Ω		
V 7	6AU6	1.1Ω	0Ω	.1Ω	0Ω	† 7KΩ	† 7KΩ	150Ω		
V 8	6AL5	INF	INF	0Ω	.1Ω	20KΩ	0Ω	0Ω		
V 9	6AV6	10Meg	0Ω	0Ω	.1Ω	NC	NC	† 220KΩ		
V 10	6K6GT	TP	.1Ω	† 400Ω	† 120Ω	470KΩ	NC	0Ω	270Ω	
V 11	12AU7A	† 6.7KΩ	† 470KΩ	4KΩ	0Ω	0Ω	† 470KΩ	2.7Meg	0Ω	.1Ω
V 12	6C4	▲ 1.5Meg	NC	.1Ω	0Ω	▲ 1.5Meg	800KΩ	0Ω		
V 13	6AQ5	6.8Meg	0Ω	.1Ω	0Ω	† 600Ω	† 120Ω	6.8Meg		
V 14	6AL5	15Ω	15Ω	.1Ω	0Ω	4.8Meg	0Ω	4.8Meg		
V 15	6SN7GTA	5Meg	† 8.3KΩ	1.5KΩ	100KΩ	† 82KΩ	1.5KΩ	.1Ω	0Ω	
V 16	6BQ6GTB/ 6CU6	TP	.1Ω	NC	† 1.9KΩ	500KΩ	NC	0Ω	0Ω	TOP CAP ▲ 9Ω
V 17	6AX4GT	TP	NC	1.5Meg	NC	† 120Ω	NC	.1Ω	0Ω	
V 18	1X2B		PINS	1-9	HAVE	INF	RESISTANCE			TOP CAP ▲ 470Ω
V 19	5U4GA	NC	70KΩ	NC	19Ω	NC	16Ω	NC	70KΩ	
V 20	21AUP4A	0Ω	22KΩ	PIN 6 ▲ 30Ω	PIN 10 ▲ 19Ω	PIN 11 † 280KΩ	PIN 12 .1Ω			

† MEASURED FROM PIN 8 OF V19.
▲ MEASURED FROM PIN 3 OF V17.
NC-NO CONNECTION.
TP-TIE POINT.



TUBE PLACEMENT CHART

HOFFMAN MODELS 7B170, U, 7B182P, P2, 7M169, U, 7M181P, P2, 7W181P, 21B173, U, 21B176, S, U, 21B184, U, 21B185P, 21B188, U, U2, 21B191, C2, U, U2, 21B358, P, U, 21B360, 21B361U, U2, 21K186, U, U2, 21M172, U, 21M175, S, U, 21M183, P, U, 21M184P, 21M187, U, U2, 21M190, C2, U, U, 2, 21M357, P, U, 21M360, U, U2, 21P177, S, U, 21P185, 21P192, C2, U, U2, 21P359, P, U, 21P362, U, U2, 21U205S, U, 21W190, C2, U, U2, 21W360, U, U2, 21-189, U, U2 (Ch. 303-17, -21, 306-21, -21B, -21U, 307-21, 308-21, 309-21, -21U, -21U2, 309A-21, -21U, 310-21, -21C2, -21U, -21U2)

ALTERNATE VHF-UHF TUNER SCHEMATIC

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	REPLACEMENT DATA: HOFFMAN PART No.	STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BQ7A	5BQ7A	6BQ7 used as an alternate
V2	Mixer-Oscillator	6J6	6J6	
V3	1st. Video IF Amplifier	6CB6	6CB6	
V4	2nd. Video IF Amplifier	6CB6	6CB6	
V5	3rd. Video IF Amplifier-Video Detector	6AS8	6AS8	
V6	Video Output	6CB6	6CB6	
V7	Sound IF Amplifier	6AU6	6AU6	
V8	Ratio Detector	6AL5	6AL5	
V9	AF Amplifier	6AV6	6AV6	
V10	Audio Output	6KW6T	6KW6T	
V11	Sync Separator-Sync Phase Inverter	12AU7A	12AU7A	12AU7 used as an alternate
V12	Vert. Oscillator	6C4	6C4	
V13	Vert. Output	6AQ6	6AQ6	
V14	Horiz. AFC	6AL5	6AL5	
V15	Horiz. Mult.	6BN7GTA	5BN7GTA	6BN7GT used as an alternate
V16	Horiz. Output	6BQ6GTB/ 6CU6	5BQ6GTB/ 6CU6	6BQ6GT used as an alternate
V17	Damper	6AX4GT	6AX4GT	
V18	HV Rectifier	1K3B	1K3B	
V19	LV Rectifier	5U4GA	5U4GB	5U4GB used as an alternate

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: HOFFMAN PART No	CBS PART No	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V20	21AUP4A ①	21AUP4A ①	21AUP4A ①	21AUP4A ② ③	① Aluminized ② Silver screen "85"
	21YP4A ①	21YP4A ①	21YP4A ①	21YP4A ③	
	17HP4	17HP4	17HP4	17HP4	
				17RP4	
	17HP4B ①			17RP4B ②	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	VOLT.	REPLACEMENT DATA: HOFFMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	100	300	4304A			WG605	CDB-1009	Q-325 D-100	
B	200	200							
C	40	300							
C2A	5	50	4209		PRS150V4	BR550	TC30	TD-5-50	MMT-0505
B	5	25	(Note 1)		SHR25V5	BR550	TC30	TD-5-50	MMT-0505

ITEM No.	RATING: CAP.	VOLT.	REPLACEMENT DATA: HOFFMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C3A	5	150							
B	5	50							
C4A	10	150							
B	10	50							
C5A	10	150							
B	10	50							
C6A	10	150							
B	10	50							
C7A	10	150							
B	10	50							
C8A	10	150							
B	10	50							
C9A	10	150							
B	10	50							
C10A	10	150							
B	10	50							
C11A	10	150							
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C12A	10	150							
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C15A	10	150							
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C78A	10	150							
B	10	50							
C79A	10	150							
B	10	50							
C80A	10	150							
B	10	50							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT.	REPLACEMENT DATA: HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	3-8				829-10					
C4	3-8				829-10					
C5	3			NPO-DH3	TCZ-3R3	Z007	NPOA-030	TZ-S53	9TCCB-V33	
C7	.5-3				829-3		3115-01-GR3	C7S65A		
C9	800									
C9	120			BPD-00012	DD-121	G044	811-121	UC-5313	9GA-T13	
C10	800									
C11	800									
C12	51			51H1	DD-500	G083	831-510	UC-545	9GA-Q5	
C13	.8-3				829-3		3115-01-CR5	C7S65A		
C14	10			NPO-D10	TCZ-10	Z018	NPOA-100	ZT-S61	9TCC-Q1	
C15	5									
C16	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C17	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C18	6.8			NPO-D6.8	TCZ-6R8	Z013	NPOA-6R8	ZT-S668	9TCCB-V68	
C19	800									
C20	800									
C21	.047	200	4147	BPD-05	DF-503	CUBS247		PT4147	2TM-S47	
C22	470		14060	BPD-00047	DD-471	K080	831-471		9GA-T47	
C23	82			1489-000082	TCZ-S3	Z040	NPO-337-S20		9TCC-Q83	Note 3
C24	1000		14031	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1	
C25	.1	200	4143	P388N-1	DP-104	CUBSP1		PT401	2TM-P1	Note 2
C26	470		14060	BPD-00047	DD-471	K080	831-471		9GA-T47	
C27	1000		14031	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1	
C28	47			NPO-D47	TCZ-47	Z033	NPO-338-470		9TCC-Q47	
C29	3.2			NPO-S3.2	TCZ-3R3	Z005	NPOA-3R3		9TCCB-V32	Note 4
C30	1000		14031	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1	
C31	470		14060	BPD-00047	DD-471	K080	831-471		9GA-T47	
C32	1000		14031	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1	
C33	33			NPO-D33	TCZ-33	Z039	831-330		9TCC-Q33	
C34	470		14060	2U470	DE-471	K080	831-471		9GA-T47	
C35	470		14060	2U470	DE-471	K080	831-471		9GA-T47	
C36	1000		14031	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1	
C37	1000		14031	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1	
C38	10		14028	NPO-S2D	TCZ-10	Z026	NPOA-100	ZT-541	9TCC-Q1	
C39	.1	200	4143	P388N-1	DP-104	CUBSP1		PT401	2TM-P1	Note 2
C40	.047	200	4147	BPD-05	DF-503	CUBS247		PT4147	2TM-S47	Note 5
C41	.1	200	4143	P388N-1	DP-104	CUBSP1		PT401	2TM-P1	
C42	5000		4039	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C43	5000		4039	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C44	30		4043		TCZ-30	Z017	831-300		9TCC-Q30	
C45	.1	400	4160	P468N-1	DP-104	CUBSP1		PT401	4TM-P1	
C46	2.2		4069	BPD-S2.2	TCZ-2R2	Z005	NPOA-2R2		9TCCB-V22	
C47	68		4048							
C48A	4000		4036	BPD-XX004	DE-402 ①	D6078	831-004		5HK-SD4	
B	4000				DE-403 ①			DC-534		
C49	680			S1680	DE-681	TP50	811-681	DC-5368	5GA-T68	Note 4
C50	5000		4039	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	Note 6
C51	5000		4039	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C52	5000		4039	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C53	.0047	200	4127	S14700	DE-472	CUBSD47	GP2-333-472	PT6247	6TM-D47	Note 7
C54	.022	400	4180	BPD-S3	DF-303	CUBS233	817-03	PT4233	4TM-S33	
C55	.0022	200	4126	1454-0022		1H5D22			MS-233	
C56	330		4044	S1330	DE-331	G051	811-331		9GA-T33	
C57	.0047	400	4137	S14700	DE-472	CUBMD47	GP2-333-472	PT6247	6TM-D47	
C58A	2000							DC-523		
B	5000							DC-525		
C	5000							DC-525		

ITEM No.	RATING: RESIST-ANCE	WATTS	REPLACEMENT DATA: HOFFMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ		4287	A47-500K-S	CS10-S	Q11-103	U-48	Volume-Note 1
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KS-1	SWE-13	76-1	U3-28	Attach to R1A.
R2A	500Ω		4288	A3-4	A47-500-S	Q11-103	TA35L	Contrast-Note 1
B	Not Req.		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R2A.
R1 (A & B)	500Ω		4310	F1-1	RTV-483	Q2-S27 †	UF31L	Contrast (Panel)-Note 2
R3 (C	Switch			KS-18			U35-2	Volume (Rear) Tap at 150KΩ
R1 (A	500Ω		4291			Q2-S50 *		Attach to Section B
& B	500KΩ							Volume (Rear)
R1C	Switch			KS-1				Attach to Section B
R2A	150KΩ		4285	A3-43	A47-150K-S	Q11-328	TA194L	Brightness-Note 1
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R3A.
R3	150KΩ		4974			Q11-324		Brightness- Note 2
R3	150KΩ		4289			Q11-328		Brightness-Note 3
R4A	500KΩ		4286	A3-39	A47-500K-S	Q11-103	TA35L	Vertical Hold-Note 1
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R4A.
R4	500KΩ		4990			Q11-133		Vertical Hold-Note 3
R4	500KΩ		4975			Q11-153		Vertical Hold-Note 2
R5A	4Meg		4970	A3-86	A47-4Meg-S	Q11-141	TA56L	Area-Note 4
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R5A.
R5	4Meg		4986			Q11-143		Area-Note 2
R6A	500KΩ		4972	BX-31	A47-500K-S	Q11-133	TA94L	Vertical Linearity-Note 4
B	Shaft		Not Req.	Not Req.	Not Req.	Not Req.	Not Req.	Attach to R6A.
R7	50KΩ		4973			Q11-123		Vertical Linearity-Note 3
R7A	4Meg		4970	A3-86	A47-4Meg-S	Q11-141	TA56L	Vertical Size-Note 4
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R7A.
R7	4Meg		4989			Q11-141		Vertical Size-Note 2
R8A	2Meg		4985	BX-75	A47-2Meg-S	Q11-139	TA56L	Focus-Note 4
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R8A.
R8A	1.5Meg		4239	AB-75	A47-1.5Meg-S	Q11-135	U-156	Focus-Note 3
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R8A.
R8	1.5Meg		4971			Q11-138		Focus-Note 2

Note 1. Used in Chassis 307, 309, and 310.
Note 2. Used in Chassis 303.
Note 3. Used in Chassis 306 and 308.
Note 4. Used in Chassis 306, 307, 308, 309, and 310.
† Concentrikit Equivalent, K-2 Kit, Base Elements and Shafts, Bil-103, P1-304 (Panel)
Bil-133X, Ri-223 (Rear)
76-1 (Switch)
* Universal Replacement (Mallory Exact Duplicate Part No. UE-75)
* Concentrikit Equivalent, K-4 Kit, Base Element and Shafts, Bil-103, P1-304 (Panel)
Bil-133, Ri-233 (Rear)
76-1 (Switch)

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C59	5000		4039	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C60	.1	400	4150	P468N-1	DP-104	CUBMP1		PT401	4TM-P1	
C61	.047	200	4123	BPD-05	DF-503	CUBS247		PT4147	2TM-S47	
C62	.047	300	4133	BPD-05	DF-503	CUBS247		PT4147	2TM-S47	
C63	1000		14031	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1	Note 8
C64	.01	600	14119							Note 9
C65	.01	600	14129							Note 9
C66	50000		14064	BPD-02	DD-303	K088	817-03	PT613	6HK-S5	Note 2
C67	.047	300	4188	BPD-05	DF-503	CUBS247		PT4147	2TM-S47	
C68	.001	300	4175	1464-001		1R5D1			MS-21	
C69	.001	300	4175	1464-001		1R5D1			MS-21	
C70	.0047	300	4127	S14790	D6-472	CUBSD47	GP2-333-472	PT6247	6TM-D47	
C71	.047	300	4188	BPD-05	DF-503	CUBS247		PT4147	2TM-S47	
C72	.1500	500	4065	1464-0039		1R5D38			MS-239	
C73	470	500	14050	1469-00047	D6-471	5RS7Y47	811-471		MS-347	
C74	470	500	14050	1469-00047	D6-471	5RS7Y47	811-471		MS-347	
C75	5000		4039	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C76	.22	200	4131	P268N-32		CUBSP19			PT2123	3TM-P22
C77	47	3000	14048	BYD-30-47	DD30-470	VR3G47	3KV-470		DC30647	30GA-Q47
C78	.047	400	4133	BPD-05	DF-503	CUBS247		PT4147	4TM-S47	
C79	47	3000	14048	BYD-30-47	DD30-470	VR3G47	3KV-470		DC30647	30GA-Q47
C80	.1	600	4144	P468N-1	DP-503	CUBSP1			PT501	6TM-P1

CONTROLS

ITEM No.	RATING: RESIST-ANCE	WATTS	REPLACEMENT DATA: HOFFMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ		4287	A47-500K-S	CS10-S	Q11-103	U-48	Volume-Note 1
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KS-1	SWE-13	76-1	U3-28	Attach to R1A.
R2A	500Ω		4288	A3-4	A47-500-S	Q11-103	TA35L	Contrast-Note 1
B	Not Req.		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R2A.
R1 (A & B)	500Ω		4310	F1-1	RTV-483	Q2-S27 †	UF31L	Contrast (Panel)Note 2
R3 (C	Switch			KS-18			U35-2	Volume (Rear) Tap at 150KΩ
R1 (A	500Ω		4291			Q2-S50 *		Attach to Section B
& B	500KΩ							Volume (Rear)
R1C	Switch			KS-1				Attach to Section B
R2A	150KΩ		4285	A3-43	A47-150K-S	Q11-328	TA194L	Brightness-Note 1
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R3A.
R3	150KΩ		4974			Q11-324		Brightness- Note 2
R3	150KΩ		4989			Q11-328		Brightness-Note 3
R4A	500KΩ		4286	A3-39	A47-500K-S	Q11-103	TA35L	Vertical Hold-Note 1
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R4A.
R4	500KΩ		4990			Q11-133		Vertical Hold-Note 3
R4	500KΩ		4975			Q11-153		Vertical Hold-Note 2
R5A	4Meg		4970	A3-86	A47-4Meg-S	Q11-141	TA56L	Area-Note 4
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R5A.
R5	4Meg		4986			Q11-143		Area-Note 2
R6A	500KΩ		4972	BX-31	A47-500K-S	Q11-133	TA94L	Vertical Linearity-Note 4
B	Shaft		Not Req.	Not Req.	Not Req.	Not Req.	Not Req.	Attach to R6A.
R7	50KΩ		4973			Q11-123		Vertical Linearity-Note 3
R7A	4Meg		4970	A3-86	A47-4Meg-S	Q11-141	TA56L	Vertical Size-Note 4
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R7A.
R7	4Meg		4989			Q11-141		Vertical Size-Note 2
R8A	2Meg		4985	BX-75	A47-2Meg-S	Q11-139	TA56L	Focus-Note 4
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R8A.
R8A	1.5Meg		4239	AB-75	A47-1.5Meg-S	Q11-135	U-156	Focus-Note 3
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R8A.
R8	1.5Meg		4971			Q11-138		Focus-Note 2

Note 1. Used in Chassis 307, 309, and 310.
Note 2. Used in Chassis 303.
Note 3. Used in Chassis 306 and 308.
Note 4. Used in Chassis 306, 307, 308, 309, and 310.
† Concentrikit Equivalent, K-2 Kit, Base Elements and Shafts, Bil-103, P1-304 (Panel)
Bil-133X, Ri-223 (Rear)
76-1 (Switch)
* Universal Replacement (Mallory Exact Duplicate Part No. UE-75)
* Concentrikit Equivalent, K-4 Kit, Base Element and Shafts, Bil-103, P1-304 (Panel)
Bil-133, Ri-233 (Rear)
76-1 (Switch)

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: HOFFMAN PART No.	IRC PART No.	NOTES
R9	47KΩ	½	4155	BTS-47K	
R10	15KΩ	½			
R11	100KΩ	½	4571	BTS-100K	
R12	270KΩ	½	4803	BTS-270K	
R13	180KΩ	½	4634	BTS-180K	
R14	470Ω	½	4588	BTS-470	
R15	10KΩ	½	4597		
R16	470Ω	½		BTS-4700	
R17	15KΩ	½			
R18	220KΩ	½	4618		
R19	15KΩ	½			
R20	560KΩ	½	4590	BTS-560K	Note 1
R21	270KΩ	½	4803	BTS-270K	Note 2
R22	2700Ω	½	4579	BTS-2700	Note 3
R23	470Ω	½	4638	BTS-470	
R24	470Ω	½	4588	BTS-470	
R25	47KΩ	½	4559		
R26	470Ω	½	4638	BTS-470	
R27	470Ω	½	4638	BTS-47	
R28	470Ω	½	4638	BTS-470	
R29	15KΩ	½			Note 4
R30	470Ω	½	4638	BTS-470	
R31	47Ω	½	4639	BTS-47	
R32	470Ω	½	4588		
R33	470Ω	½	4638	BTS-470	
R34	1000Ω	½	14688	BTS-1000	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: HOFFMAN PART No.	IRC PART No.	NOTES
R35	150Ω	½	4618	BTS-150	
R36	2300Ω	½	4650		Note 5
R37	3700Ω	½	4570		Note 6
R38	13KΩ	½	4646		
R39	47KΩ	½	4559	BTS-47K	
R40	1.5Meg	½	4605	BTS-1.5Meg	
R41	470KΩ	½	4622	BTS-470K	Note 7
R42	470Ω	½	4570	BTA-4700	
R43	180KΩ	½	4634	BTS-180K	
R44	22KΩ	½	4626	BTS-22K	
R45	68000Ω	½	4557	BTS-6800	
R46	150Ω	½	4618	BTS-150	
R47	10KΩ	½	4597	BTS-10K	
R48	10KΩ	½	4597	BTS-10K	
R49	180Ω	½	14618	BTS-180	
R50	10Meg	½	4615	BTS-10Meg	
R51	220KΩ	½	4618	BTS-220KΩ	
R52	470KΩ	½	4622	BTS-470K	
R53	270Ω	½	4563	BTS-270	
R54	10KΩ	½	4597	BTS-10K	
R55	2.2Meg	½	4606	BTS-2.2Meg	Note 8, 9
R56	470KΩ	½	4622	BTS-470K	
R57	470KΩ	½	4622	BTS-470K	
R58	27000Ω 5%	½	24535	BTS-4700 5%	Note 10
R59	3900Ω	½	4537	BTS-3900	
R60	1800Ω	½	4540	BTS-1800	

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: HOFFMAN PART No.	IRC PART No.	NOTES
R74	820Ω	½	4651		
R75	1500Ω 5%	½	4610		Note 13
R76	300KΩ	½	4571		
R77	82KΩ	½	24570		
R78	560Ω	½	4629		
R79	470KΩ	½	4622		
R80	22KΩ	½	4626		Note 14
R81	180Ω	½	24518		
R82	100Ω	½	4650		
R83	1Ω	2	14508		
R84	2.2Ω	½	4735	BW-½-2.2	
R85	100KΩ	10	47014	1.5A-125	
R86	12KΩ	½	4646	BTS-12K	
R87	330KΩ	½	34634	BTS-330K	

Note 1. A 2.2Meg ½W resistor is used in Chassis 303. (Mfgr. Part No. 4592).
Note 2. A 390KΩ ½W resistor is used in Chassis 303. (Mfgr. Part No. 4632).
Note 3. A 1200Ω ½W resistor is used with Pentode Tuner. (Mfgr. Part No. 34503).
Note 4. Not used in some versions.
Note 5. Some versions use a 1000Ω ½W resistor in this application.
Note 6. Some versions use a 3900Ω ½W resistor in this application.
Note 7. A 560KΩ ½W resistor is used in Chassis 303.
Note 8. A 82KΩ ½W resistor is used in chassis prior to serial #2514542.
Note 9. A 4.7Meg ½W resistor is used in Chassis 306, 307, 308, 303. (Mfgr. Part No. 34659).
Note 10. A 3000Ω ½W resistor is used in Chassis 303. (Mfgr. Part No. 34538).
Note 11. A 470KΩ ½W resistor is used in Chassis 303. (Mfgr. Part No. 4622).
Note 12. A 100KΩ ½W resistor is used in some versions in this application. (Mfgr. Part No. 4571.
Note 13. A 1200Ω 5% resistor is used in Chassis 303. (Mfgr. Part No. 4652).
Note 14. A 47KΩ ½W resistor is used in Chassis 303.

TRANSFORMER (POWER)

ITEM No	RATING: PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA: HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
T1	117VAC @1.34A	420VCT @.240ADC	5VAC @ 3A	6.3VAC @ 8A	5067-1 ① 5067 ② 5068 ③ 5058 ④ 5052 ⑤	P9735 ①	P-2831 ②	P-8168 ③		R-60-BC ④

1 Tape 6.3V ③ 1.2A winding.
2 Used in Chassis 309 and 310.
3 Used in Chassis

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	HOFFMAN PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5 1/4"	PM	3.2Ω	H9091-2 ①	52A1	217S1	① 5 1/4" PM speaker used in Models 21M175S, 21B176S, 21P177S, 21M175SU, 21B176SU, 21P177SU, 21W190, 21M190, 21B191, 21P192, 21W190C2, 21M190C2, 21B191C2, 21P192C2, 21W190U, 21M190U, 21M191U, 21P192U, 21W190U2, 21M190U2, 21B191U2, and 21P192U2
				H9091 ②			② Alternate 5 1/4" PM speaker.
	6"x 10"	PM	3.2Ω	H9079 ③			③ Used in Models 21W360, 21M360, 21B360, 21P362, 21W360U, 21M360U, 21B361U, 21P362U, 21U360U2, 21M360U2, 21B361U2, and 21P362U2.
				9117 ④			④ Used in Models 7M181P, 7M181P2, 7B182P, 7B182P2, 7W181P, 21M183, 21B184, 21M183U, 21B184U, 21M183P, 21B184P, 21K186, 21M187, 21B188, 21-189, 21K186U, 21M187U, 21B188U, 21-189U, 21K186U2, 21M187U2, 21B188U2, and 21-189U2.
				9102 ⑤			⑤ Used in Models 21U205S, 21U205SU, 21M357, 21B358, 21P359, 21M357U, 21B358U, 21P359U, 21M357P, 21B358P, and 21P359P.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	HOFFMAN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	IF Trap	0Ω						Wound on 68MMF Cap.
L2	IF Trap	0Ω						Wound on 68MMF Cap.
L3	Ant. Coils	0ΩCT	0Ω					
L4	IF Trap	1Ω						
L5	Fil. Choke	0Ω						
L6	Neut. Coil	0Ω						
L7	RF, Mixer Grid, Osc. Coils	0Ω						
L8	Fil. Choke	0Ω						
L9	Feedback Coil	.5Ω						
L10	RF Coil	0Ω						
L11	Conv. Plate	0Ω						
L12	1st Video IF	.1Ω		5219A	17-4522 *	TV-131	6219 *	
L13	2nd Video IF	.1Ω	.1Ω	5220A			6221	Includes 41. 25MC Trap
L14	3rd Video IF	.1Ω	.1Ω	5221A			6222	Includes 47. 25MC Trap
L15	4th Video IF	.1Ω	.1Ω	5254A	17-5004	TV-125	6234	Note 1
L16	Series Peaking Coil	7.5Ω		5263A	19-3100	TV-181	6177	100 Microhenries, Note 2 & 9
L17	Shunt Peaking Coil	13Ω		5250A	19-3300		6132	330 Microhenries- Note 3
L18	Series Peaking Coil	13Ω		5251A	19-4400 ■		6134 ■	390 Microhenries- Wound on 8.2KΩ Resistor Note 4
L19	4.5MC Trap	3.3Ω		5256A	20-1004	TV-151	1469	Note 5
L20	Shunt Peaking Coil	7.5Ω		5248A	19-3100 ▲	TV-181 ▲	6177 ▲	100 Microhenries, Wound on 6.8KΩ resistor-Note 6
L21	Sound IF	1.1Ω		5255A	20-1004	TV-151	1469	Note 7
L22	Ratio Det.	16Ω	1.5ΩCT	5252A	17-3497	TV-115	6205	Tertiary Winding=.7Ω-Note 8

Note 1. Alternate Part No. 5222A used in Chassis 303.
Note 2. Alternate Part No. 5448 used in Chassis 303.
Note 3. Alternate Part No. 5449 used in Chassis 303.
Note 4. Alternate Part No. 5450 used in Chassis 303.
Note 5. Alternate Part No. 5453 used in Chassis 303.
Note 6. Alternate Part No. 5451 used in Chassis 303.
Note 7. Alternate Part No. 5454 used in Chassis 303.
Note 8. Alternate Part No. 5235A used in Chassis 303.
Note 9. Some versions in this application use a 180 Microhenries peaking coil Part No. 5249A.
* Use one winding only.
■ Parallel with 8.2KΩ resistor.
▲ Parallel with 6.8KΩ resistor.

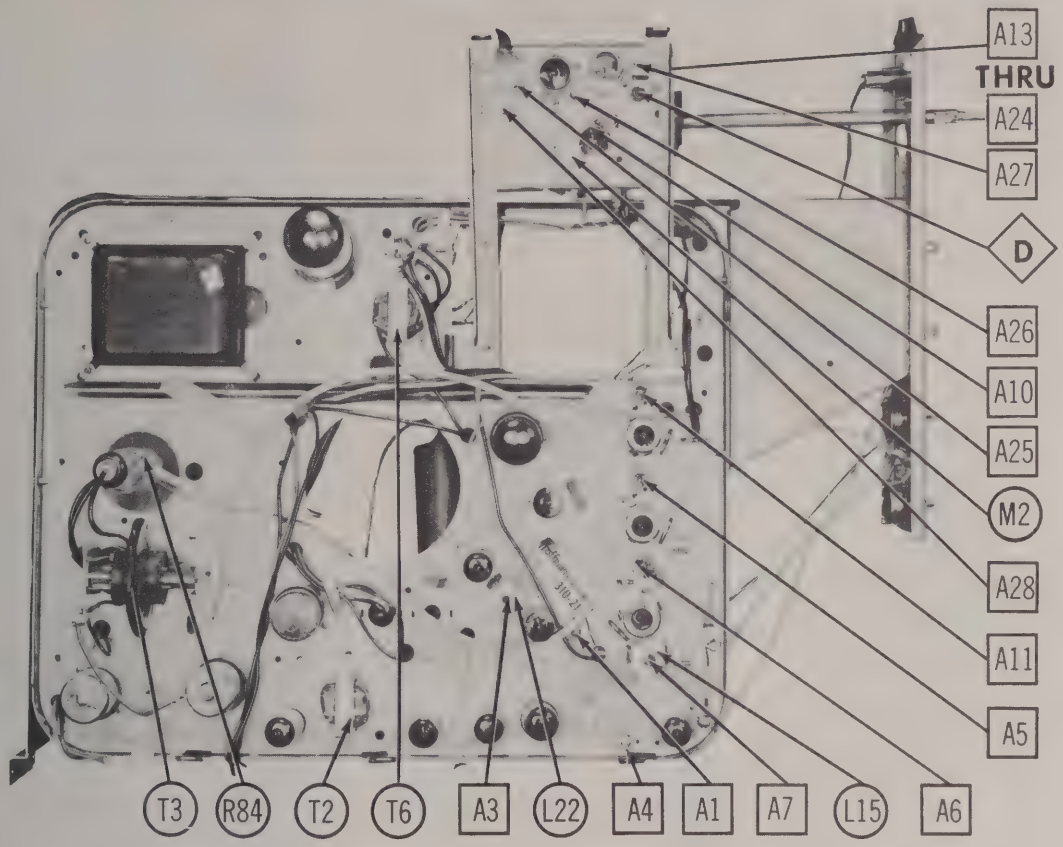
TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI.	SEC.	HOFFMAN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L23	60Ω		5447	19-1576	TV-163	6210			HS-5	
			5236A ①							

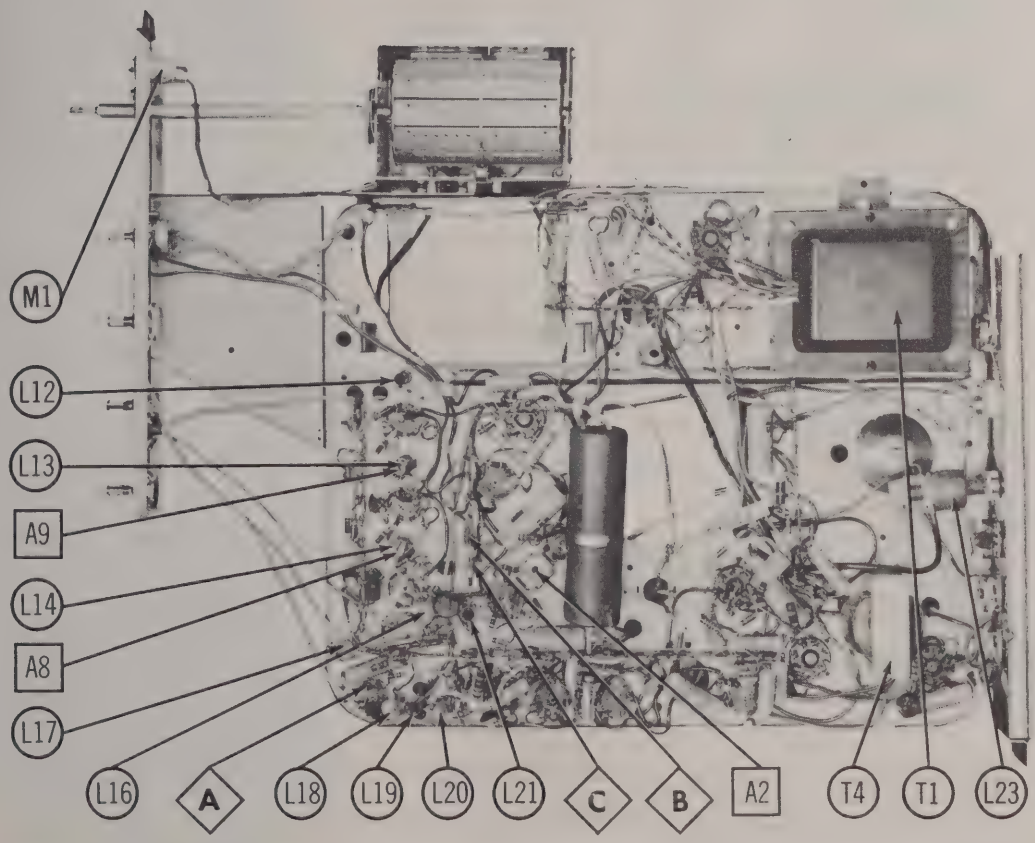
① Alternate Part No. used in Chassis 303.

MISCELLANEOUS

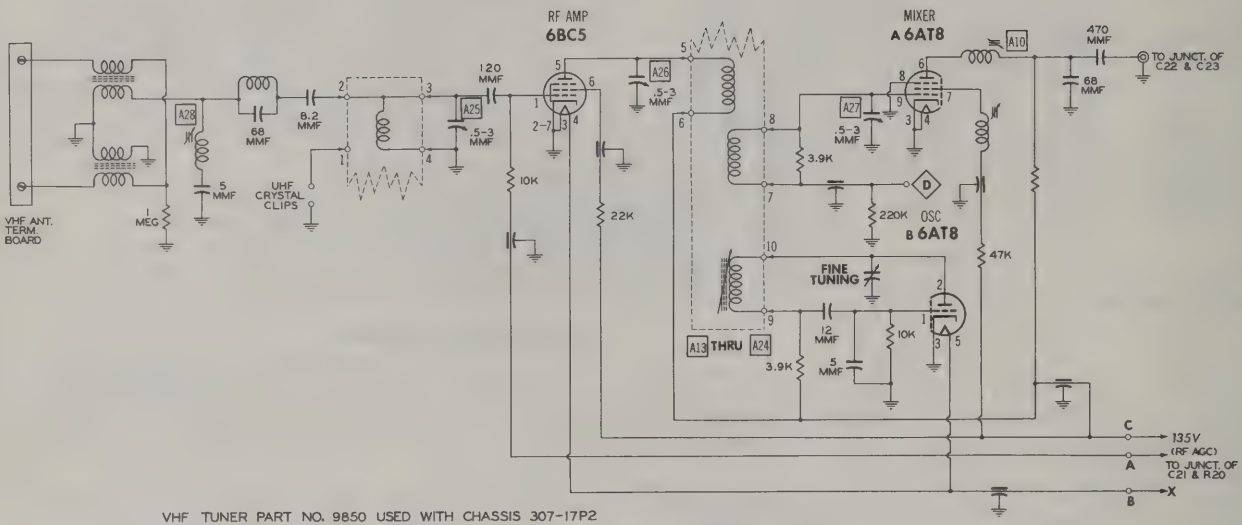
ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
M1	Dial Light	9676	#51
M2	Tuner	9857	VHF - Chassis 310-21, 310-21C2
	Tuner	9839	VHF - Chassis 306-21, 303-17, 303-21, 306-21B, Chassis 303-17, 303-21 may use alternate VHF tuner part #9786
	Tuner	9829	VHF - Chassis 308-21P
	Tuner	9843	VHF - Chassis 307-17P
	Tuner	9850	VHF - Chassis 307-17P2
	Tuner	9855	VHF - Chassis 309-21P2, 309A-21P2
M3	Tuner	9838	VHF-UHF - Chassis 306-21U, 303-17U, 303-21U, 306-21BU, Chassis 303-17U, 303-21U may use alternate tuner part #9814
	Tuner	9858	VHF-UHF - Chassis 309-21U, 309-21U2, 309A-21U, 310-U, 310-U2
M4	Switch		Earphone-loud speaker (SPDT) - Not used in some versions
M5	Centering Device	9722	
M6	Ion Trap	9713	Chassis 309, 310 (36 Gauss)
	Ion Trap	9702	Chassis 303, 307, 306, 308 (45 Gauss)



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENT.



VHF TUNER PART NO. 9850 USED WITH CHASSIS 307-17P2
VHF TUNER PART NO. 9855 USED WITH CHASSIS 309-21P2, AND 309A-21P2

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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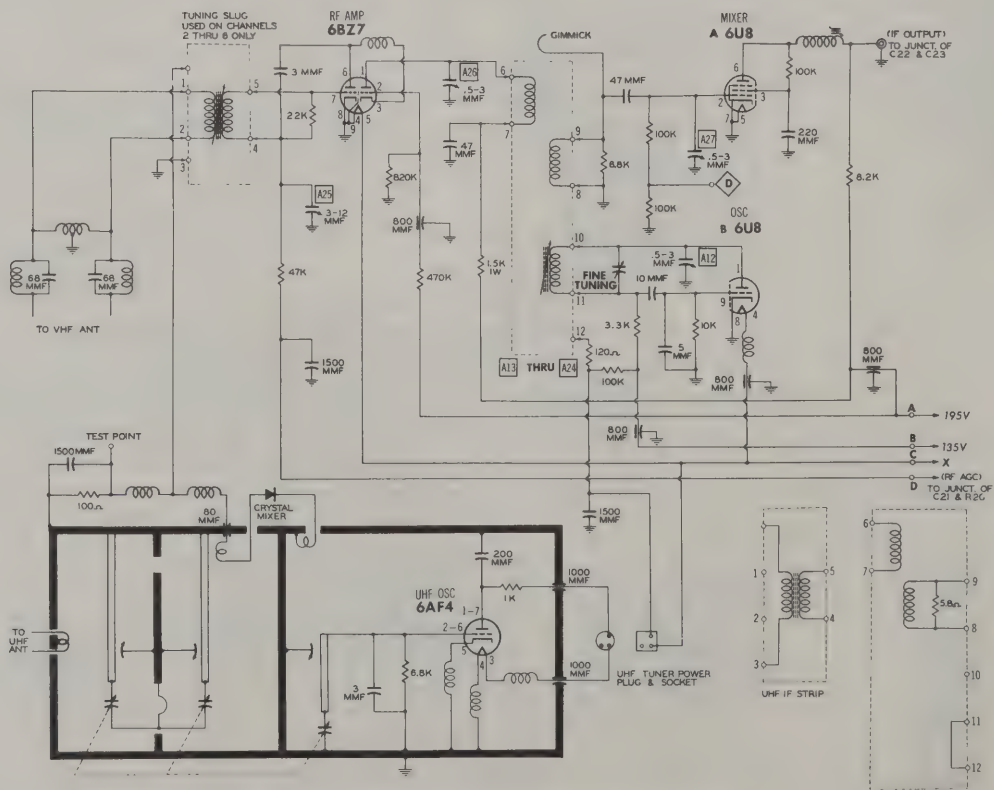
ALTERNATE VHF TUNER SCHEMATIC



UHF - VHF TUNER PART NO. 9858 USED WITH CHASSIS 309-21U, 309-21U2, 309A-21U, 310-U, AND 310-U2

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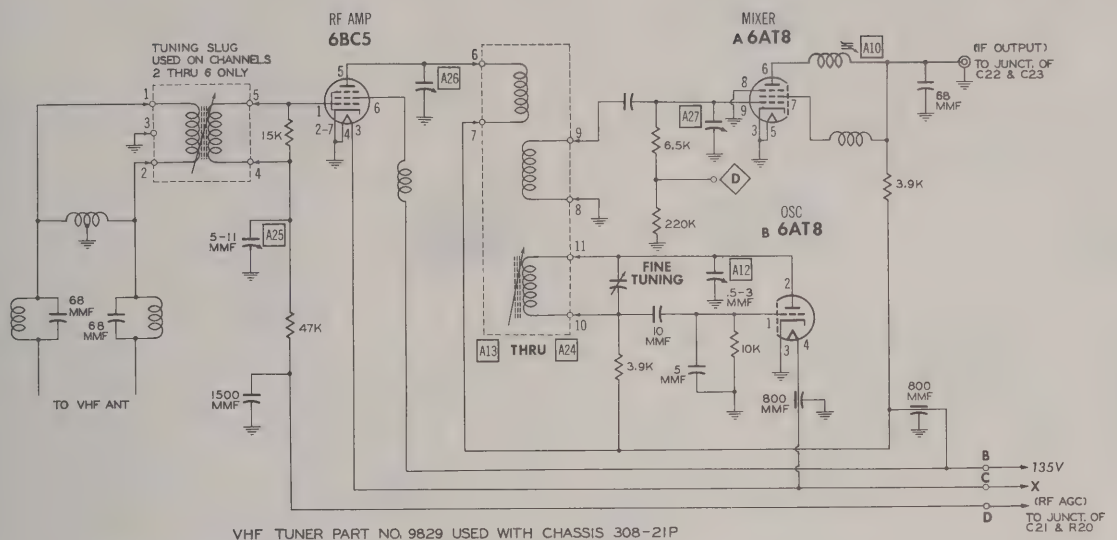
ALTERNATE VHF-UHF TUNER SCHEMATIC



VHF TUNER PART NO. 9829 USED WITH CHASSIS 308-21P
VHF TUNER PART NO. 9843 USED WITH CHASSIS 307-17P

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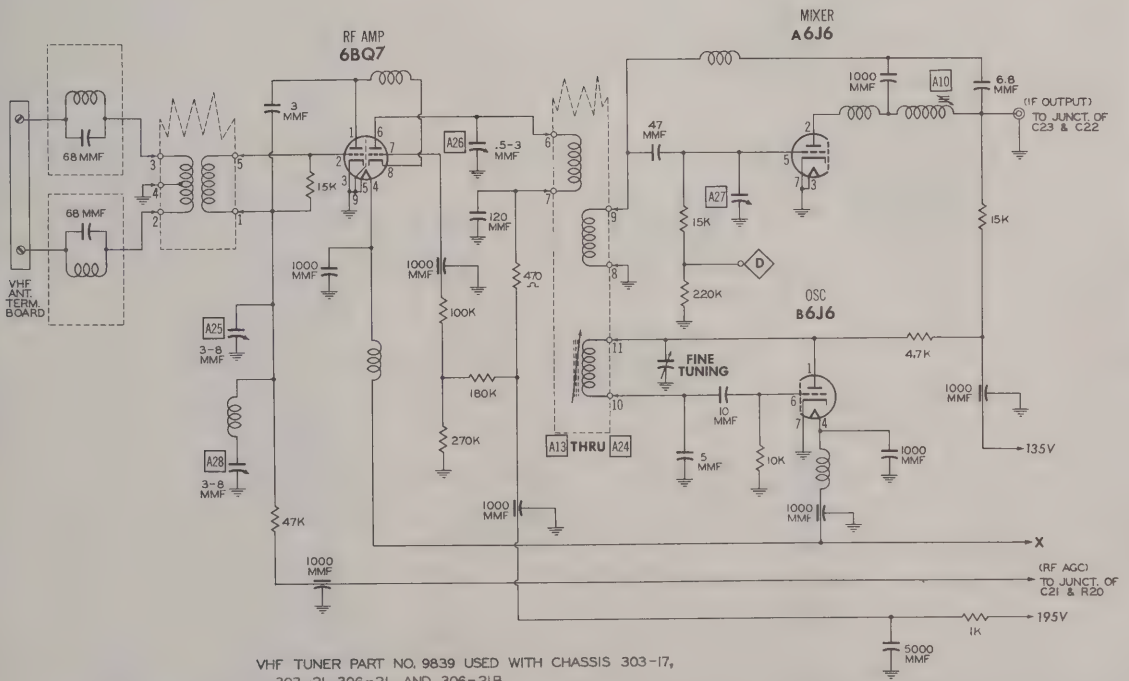
ALTERNATE VHF TUNER SCHEMATIC



VHF TUNER PART NO. 9839 USED WITH CHASSIS 303-17,
303-21, 306-21, AND 306-21B

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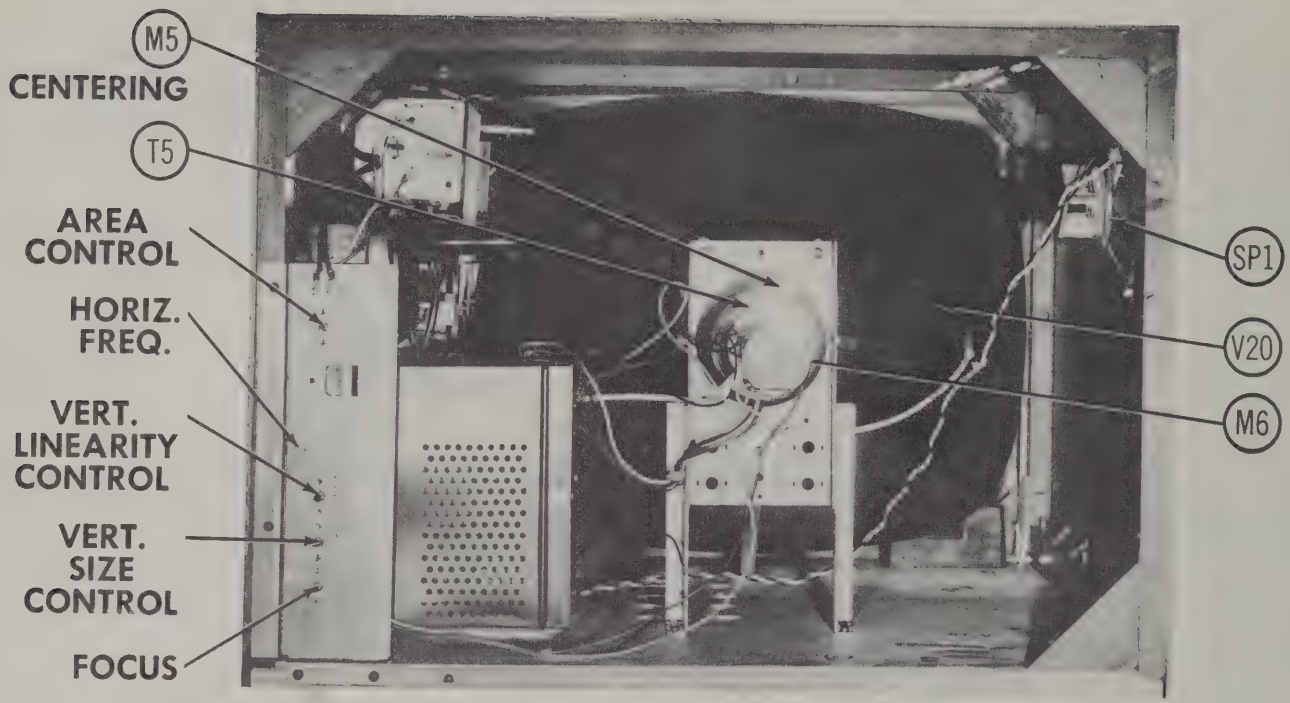
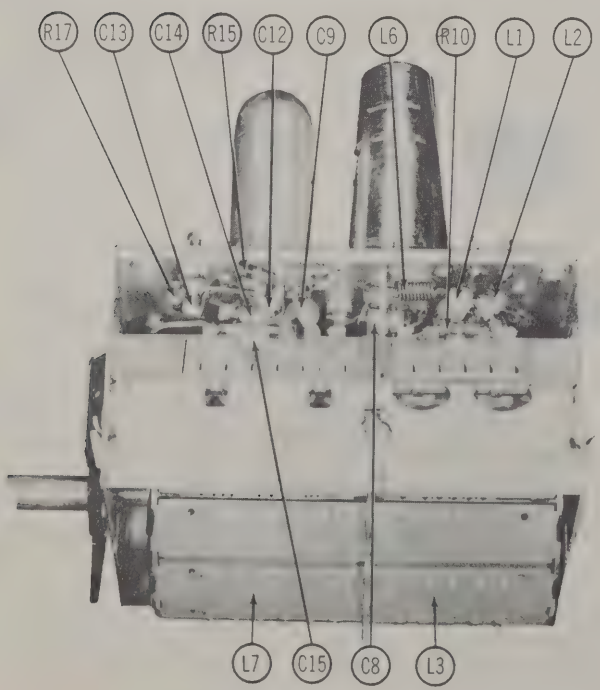
ALTERNATE VHF TUNER SCHEMATIC



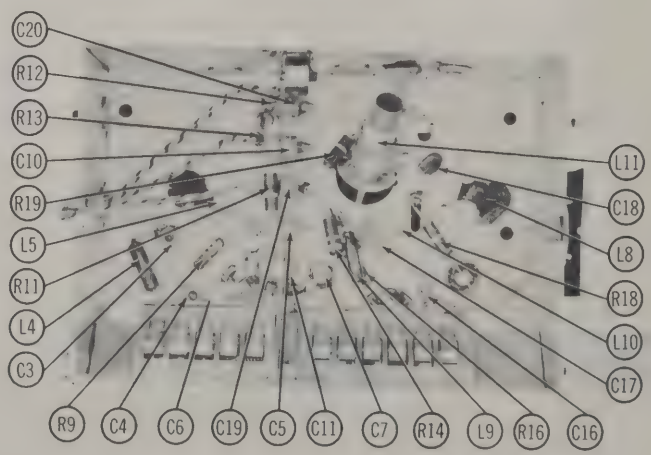
CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

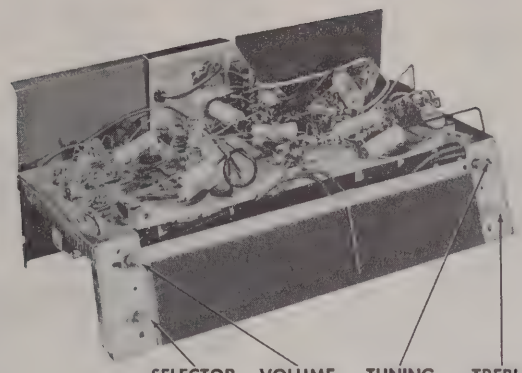
Turn the set on and tune in a TV station, preferably a test pattern.
Adjust the horizontal frequency slug of L23 until the picture synchronizes horizontally.
Switch off channel and back again, the picture should fall in sync.



RF TUNER RIGHT SIDE



RF TUNER BOTTOM VIEW



TRADE NAME	Magnavox Chassis CR-716AA
MANUFACTURER	Magnavox Co., 2131 Bueter Rd., Fort Wayne, Ind.
TYPE SET	AC Operated AM Superheterodyne Receiver
TUBES (Eight)	Types 6BA6 RF Amp., 6BE6 Converter, 6BA6 IF Amp., 6AL5 Det.-AVC, 12AX7 AF Amp.-Phase Inverter, (2) 6V6GT Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC-50/60 Cycles — RATING .57 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Set band switch to broadcast position.
Set treble control to sharp tune position.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400% Mod.)	Point of non-interference (Near 1000KC)	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1400KC	1400KC	"	A5	"
3.		Loop	600KC	600KC	"	A6, A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	1400KC	1400KC	"	A8, A9	"

AM IF ALIGNMENT USING AM SIGNAL GENERATOR AND OSCILLOSCOPE

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (20KC Swp.)	Point of non-interference (Near 1000KC)	Vert. Amp. thru 1Meg to point (A). Low side to chassis.	A1, A2, A3, A4	Set treble control to "sharp tune" (extreme clockwise position). Adjust for response curve of maximum peak similar to Fig. 1.
2.	"	"	"	"	"	"	Set treble control to "broad tune" position. Adjust for response curve of maximum symmetry similar to Fig. 2.

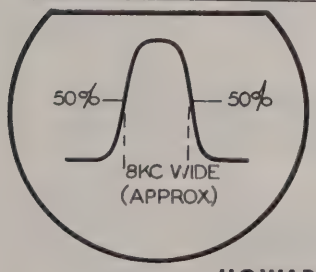


FIG. 1

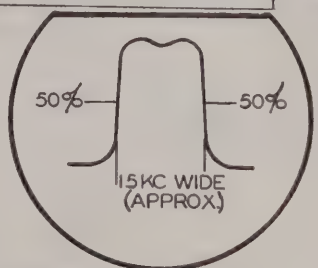


FIG. 2

PROPERTY OF
L. F. B. ANENSHIP
3324 [illegible] BLADE ST.
DENVER, COLORADO

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PARTS LIST AND DESCRIPTIONS

MAGNAVOX
Chassis CR-716AA

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		MAGNAVOX PART No.	STANDARD REPLACEMENT	
V1	RF Amplifier	6BA6	6BA6	
V2	Converter	6BE6	6BE6	
V3	IF Amplifier	6BA6	6BA6	
V4	Det. -AVC	6AL5	6AL5	
V5	AF Amp. - Phase Inv.	12AX7	12AX7	
V6	Output	6V6GT	6V6GT	
V7	Output	6V6GT	6V6GT	
V8	Rectifier	5Y3GT	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	● 40	350	270021-43		CO30	FP376. 7		D-185	TVL-2764
B	■ 35	350			BR4035	TC78		FMD-4530	TVA-2735
C	▲ 30	350							
D	30	350							
C2	20	25	270027-2	PRS25V25	BR202	TC26	TD-25-25	FM-0225	TVA-1205
C3	20	25	270027-2	PRS25V25	BR202	TC26	TD-25-25	FM-0225	TVA-1205

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

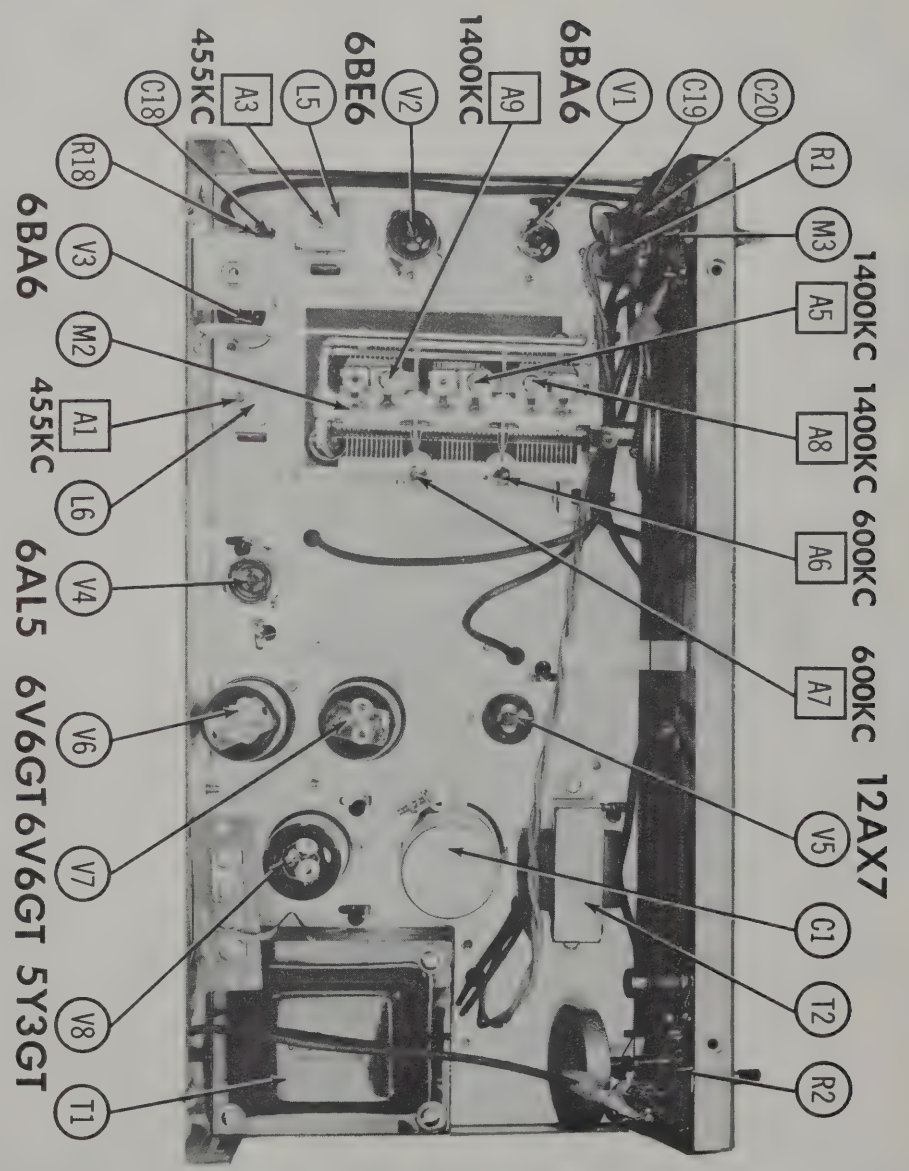
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	15	500	250187-43	NPO-SI15	TCZ-15	5R5Q15	NPOK-150		MS-415	Note 1
C5	220		250159-86	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C6	10000		250175-2	BPD-01	DD-103	KO82	811-01	DC511	5HK-S1	
C7	10000		250175-2	BPD-01	DD-103	KO82	811-01	DC511	5HK-S1	
C8	10000		250175-2	BPD-01	DD-103	KO82	811-01	DC511	5HK-S1	
C9	10000		250175-2	BPD-01	DD-103	KO82	811-01	DC511	5HK-S1	
C10	22	500	250187-45	NPO-SI22	TCZ-22	5R5Q22	NPOK-220		MS-422	
C11	. 033	600	250201-10	BPD-03	DF-303	CUB6S33		PT6133	6TM-S33	
C12	47		250207-11	NPO-SI47	TCZ-47	TZ22	NPO-338-470	ZT-5447	5TCC-Q47	
C13	15	500	250187-43	NPO-SI15	TCZ-15	5R5Q15	NPOK-150		MS-415	
C14	1. 8		250221-117	NPO-SI1. 5	TCZ-1R5	TZ04	NPOA-1R5		5TCCB-V15	
C15	10000		250175-2	BPD-01	DD-103	KO82	811-01	DC511	5HK-S1	
C16A	100		♦ 250170-1	♦ PA-97-1	♦ PC-50	♦ 111TM1	♦ 1403-01	UC-531	♦ D-1	
B	100							UC-531		
C17	10000		250175-2	BPD-01	DD-103	KO82	811-01	DC511	5HK-S1	
C18	470		250218-6	BPD-00047	DD-471	KO60	811-471	UC-5347	5GA-T47	
C19	22		250187-45	NPO-SI22	TCZ-22	5R5Q22	NPOK-220		MS-422	
C20	10000		250175-2	BPD-01	DD-103	KO82	811-01	DC511	5HK-S1	
C21	. 1	200	250202-13	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C22	. 047	600	250201-11	BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C23	220	500	250207-48	NPO-SI220	TCZ-220	5R5T22	NPO-335-221		MS-322	
C24	. 047	600	250201-11	BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C25	. 01	600	250201-7	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C26	. 1	200	250202-13	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C27	. 0068	600	250201-6	SI6800	D6-682	CUB6D68	GP3-333-682		6TM-D68	
C28A	10000	1000	250219-3		DD16-103	CUB16S1		PT1611	10HK-S1	
B	10000	1000			DD16-103	CUB16S1		PT1611	10HK-S1	

Note 1. Some versions may use 10MMF in this application (Part No. 250187-41).
♦ Items C16A, C16B, R16 are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	3Meg	½	220123-12	AB-85	A47-3Meg-Z	Q13-140	U-57	Volume
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A.
R2	5000Ω	½	220127-6					Treble & Switch

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MAGNAVOX PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R3	2200	1/2		BTS-2200	
R4	1Meg	1/2	230104-98	BTS-1Meg	
R5	220K	1/2	230104-90	BTS-220K	
R6	4700Ω	1		BTA-4700	Note 1
R7	1000Ω	1/2	230104-62	BTS-1000	
R8	1000Ω	1/2	230104-62	BTS-1000	
R9	220Ω	1/2	230104-54	BTS-220	
R10	100Ω	1/2	230104-50	BTS-100	
R11	1Meg	1/2	230104-98	BTS-1Meg	
R12	22K	1/2	230104-78	BTS-22K	
R13	220Ω	1/2	230104-54	BTS-220	
R14	22K	1	230104-78	BTA-22K	
R15	8500	3.9-7.4	240035-5		
R16	47K	1/2	♦ 250170-1	BTS-47K	
R17	150K	1/2	230104-88	BTS-150K	
R18	470K	1/2	230104-94	BTS-470K	
R19	3.3Meg	1/2	230104-104	BTS-3.3Meg	
R20	470K	1/2	230104-94	BTS-470K	
R21	1000Ω	1/2	230104-62	BTS-1000	
R22	3300Ω	1/2	230104-68	BTS-3300	
R23	470K	1/2	230104-94	BTS-470K	
R24	47K	1/2	230104-82	BTS-47K	
R25	5600Ω	1/2	230104-71	BTS-5600	
R26	470K	1/2	230104-94	BTS-470K	
R27	22K	1/2	230104-78	BTS-22K	
R28	470K	1/2	230104-94	BTS-470K	
R29	470Ω	1	230104-58	BTA-470	
R30	470Ω	1	230104-58	BTA-470	
R31	22K	1		BTA-22K	Note 2
R32	10K	1/2	230104-74	BTS-10K	
R33	5600Ω	1/2	230104-71	BTS-5600	
R34	6800Ω	1/2	230104-72	BTS-6800	
R35	100Ω	1/2	230104-50	BTS-100	
R36	100Ω	1/2	230104-50	BTS-100	
R37	400Ω	10	240021-43	1 3/4A-400	

Note 1. 4700Ω 1/2W resistor may be used in this application.
Note 2. 22K 1/2W resistor may be used in this application.
♦ Items R17, C16A, C16B are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .57A	520VCT .090ADC	5VAC @ 2A	6.3VAC @ 1.22A SEC. 4 6.3VAC @ 1.22A	300075-G2 300075-2 ①					

① Alternate power transformer.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	9.3KΩ CT	1 to 3Ω	330037-2	Z-1007	A-2901	A-3823	24S61	S-53X	

COILS (RF-IF)

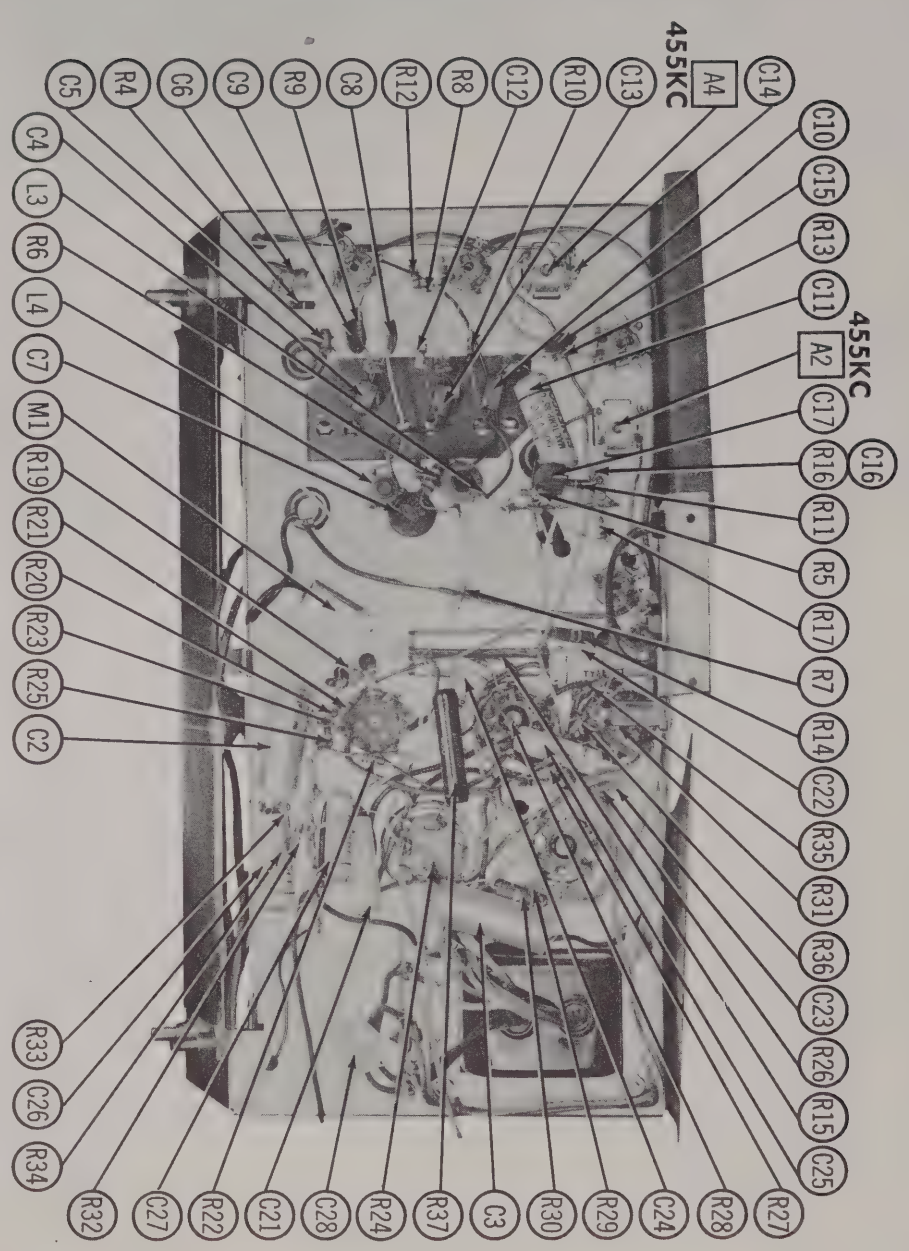
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coil			460879-1				Note 1
L2	Ant. Loading Coil							
L3	RF Coil	23Ω	3.7Ω	360329-1	14-1071 *		70-A *	
L4	Osc. Coil	5Ω		360407-1	14-1033	BC-381 ■	71-Osc. ■	Tapped @ .4Ω
L5	Input IF	10.5Ω	10.5Ω	360508-1				Tertiary Winding=.5Ω
L6	Output IF	10Ω	10Ω	360373-2	16-6758	BC-353	12-C2	

Note 1. Manufacturers Part No. includes L1, L2 and R3.
* Leads sufficient mounting support.
■ Use secondary winding.

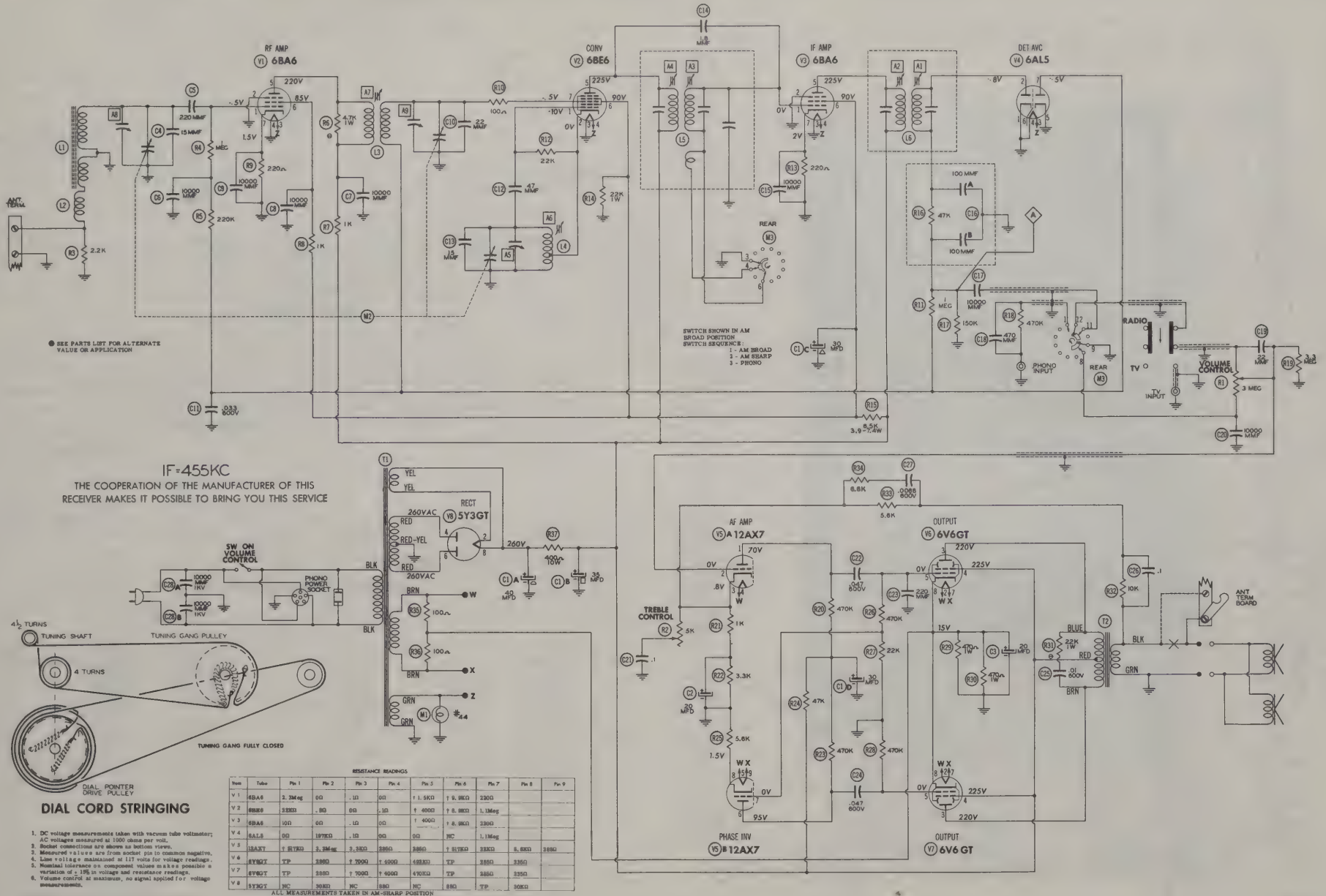
MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M1	Dial Light		#44
M2	Tuning Cap.	260122-1	3 Gang (18-520MMF, 18-530MMF, 24-195MMF)
M3	Switch	160241-1	Selector (3P-3 Position-Rotary-Wafer Type)
	Dial Pointer	102426-7	
	Dial Glass	150413-1	

CHASSIS—BOTTOM VIEW



MAGNAVOX Chassis CR-716AA



DIAL CORD STRINGING

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BA6	2.2MEG	0Ω	.1Ω	0Ω	↑ 1.5KΩ	↑ 9.8KΩ	220Ω		
V 2	6BE6	22KΩ	.8Ω	0Ω	.1Ω	↑ 400Ω	↑ 8.8KΩ	1.1Meg		
V 3	6BA6	10Ω	0Ω	.1Ω	0Ω	↑ 400Ω	↑ 8.8KΩ	220Ω		
V 4	6AL5	0Ω	197KΩ	.1Ω	0Ω	0Ω	NC	1.1Meg		
V 5	12AX7	↑ 817KΩ	3.2Meg	3.2KΩ	285Ω	285Ω	↑ 817KΩ	22KΩ	8.8KΩ	285Ω
V 6	6V6GT	TP	285Ω	↑ 700Ω	↑ 400Ω	420KΩ	TP	285Ω	235Ω	
V 7	6V6GT	TP	285Ω	↑ 700Ω	↑ 400Ω	470KΩ	TP	285Ω	235Ω	
V 8	5Y3GT	NC	30KΩ	NC	88Ω	NC	88Ω	TP	30KΩ	

ALL MEASUREMENTS TAKEN IN AM-SHARP POSITION
NC-NO CONNECTION.
TP-TIE POINT. †MEASURED FROM PIN 8 OF V8.

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PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

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MOTOROLA MODEL Y21T26CH (Ch. TS-534YB)

TRADE NAME	Motorola	MODELS	CHASSIS
		21K37B, 21K37BA, 21K37BR, 21K37BRA, 21K39, 21K39B, 21K40, 21K40B, 21K48B, 21K48M, 21T26B, 21T26BA, 21T26BR, 21T26BRA, 21T26CH, 21T26CHA, 21T27B, 21T27MA, 21T27PK, 21T28, 21T28B, 24K9, 24K9B, 24T3BR	TS-534
		Y21K37B, Y21K37BA, Y21K37BR, Y21K37BRA, Y21K39, Y21K39B, Y21K40, Y21K40B, Y21K48B, Y21K48M, Y21T26B, Y21T26BA, Y21T26BR, Y21T26BRA, Y21T26CH, Y21T26CHA, Y21T27B, Y21T27MA, Y21T27PK, Y21T28, Y21T28B, Y24K9, Y24K9B, Y24T3BR	TS-534Y VTS-534, Y WTS-534, Y

MANUFACTURER Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Illinois
TYPE SET Television Receiver
TUBES Twenty
POWER SUPPLY 110-120 Volts AC-60 Cycles RATING 1.56 Amp. @ 117mVolts AC
TUNING RANGE Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 1
Horizontal Sweep Circuit Adjustments 21
Parts List and Descriptions ..... 13 thru 16
Photographs
Cabinet-Rear View 21
Capacitor Identification 3, 10
Chassis-Top View 19
RF Tuner 18
Resistor Identification 4, 9
Photographs (Cont)
Trans., Inductor & Alignment Identification 20
Production Changes 11, 12, 17
Resistance Measurements 8
Servicing in the Field 1
Schematic (Alternate Video IF & AGC Circuit) 17
Schematic (TV) 2
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

MOTOROLA MODELS Y21K37B, BA, BR, BRA, Y21K39, B, Y21K40, B, Y21T26B, BA, BR, BRA, CH, CHA, Y21T27B, MA, PK, Y21T28, B, 21K37B, BA, BR, BRA, 21K39, B, 21K40, B, 21T26B, BA, BR, BRA, CH, CHA, 21T27B, MA, PK, 21T28, B (Ch. TS-534, Y, YB)

L. F. MANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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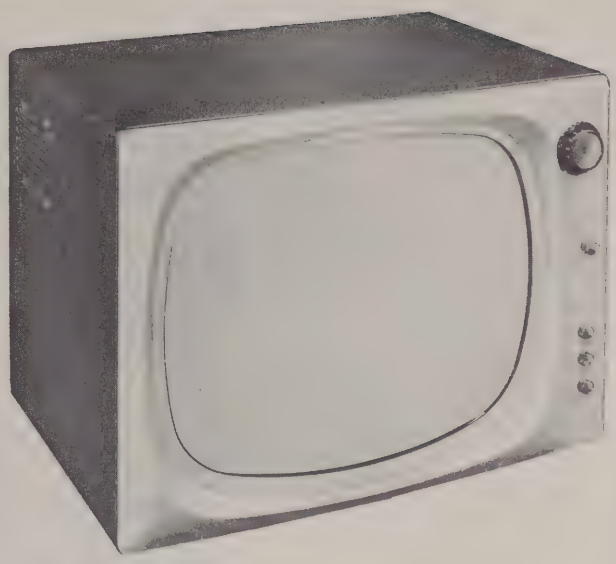
DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

1. Remove 1 metal screws. Remove rear cover.
2. Disconnect speaker plug.
3. Remove 2 metal screws from "L" shaped tie down strip at the upper rear portion of the chassis.
4. Remove 4 metal screws from safety glass retainer plates and remove safety glass.
5. Remove 2 metal screws from behind retainer plate.
6. Remove 6 metal screws holding bottom pan to cabinet.
7. Remove cabinet shell from chassis bottom pan.
8. Remove 4 speaker nuts. Remove speaker.

NOTE: If it is necessary to remove the chassis for servicing, it is also necessary to remove the speaker. The speaker is the electro-magnetic type and must be connected for proper operation.



CHASSIS

TS-534, TS-534Y, TS-534YB, VTS-534, VTS-534Y, WTS-534, WTS-534Y

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of VHF tuner oscillator adjustments, it is necessary to remove the chassis from the cabinet. (See disassembly instructions). (Also see alignment instructions on pages 6 and 7).

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 4 metal screws from glass retainers at the top and bottom edges of the safety glass. Remove retainer plates and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The horizontal oscillator may be adjusted from the rear of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal oscillator slug (B1) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (A11) located on top of chassis.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

MOTOROLA MODELS Y21K37B, BA, BR, BRA, Y21K39, B, Y21K40, B, Y21T26B, BA, BR, BRA, CH, CHA, Y21T27B, MA, PK, Y21T28, B, 21K37B, BA, BR, BRA, 21K39, B, 21K40, B, 21T26B, BA, BR, BRA, CH, CHA, 21T27B, MA, PK, 21T28, B (Ch. TS-534, Y, YB)

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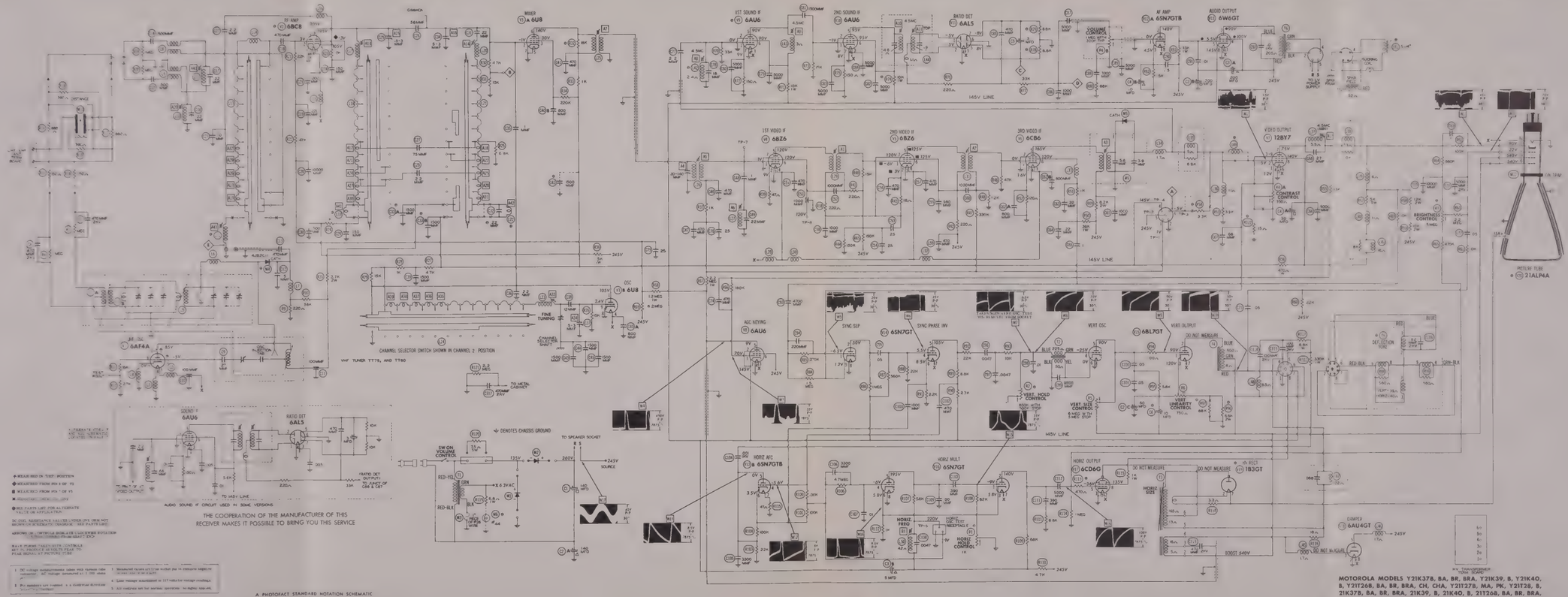
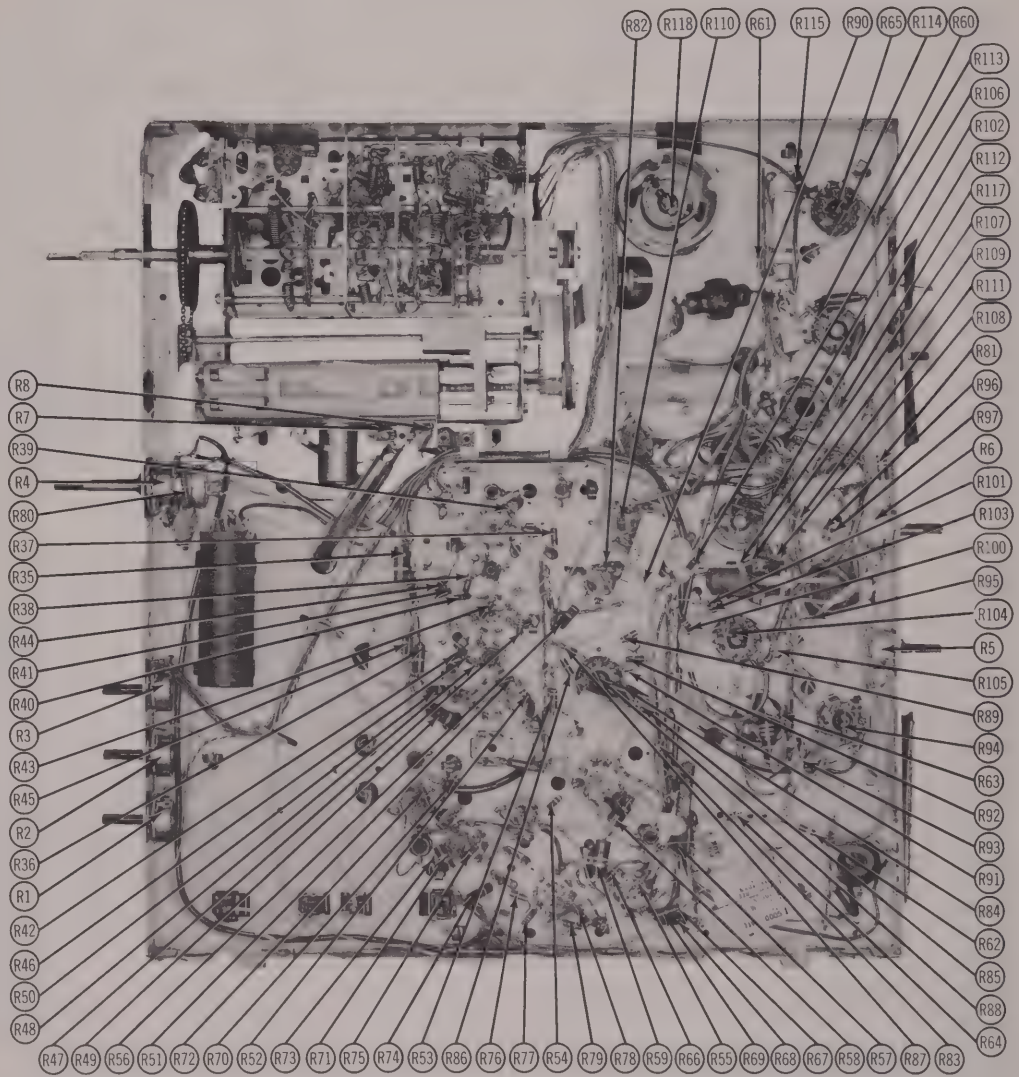

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1956
MOTOROLA MODELS Y21K37B, BA, BR, BRA, Y21K39, B, Y21K40, B, Y21T26B, BA, BR, BRA, CH, CHA, Y21T27B, MA, PK, Y21T28, B (Ch. TS-534, Y, YB)

MOTOROLA MODELS Y21K37B, BA, BR, BRA, Y21K39, B, Y21K40, B, Y21T26B, BA, BR, BRA, CH, CHA, Y21T27B, MA, PK, Y21T28, B (Ch. TS-534, Y, YB)

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

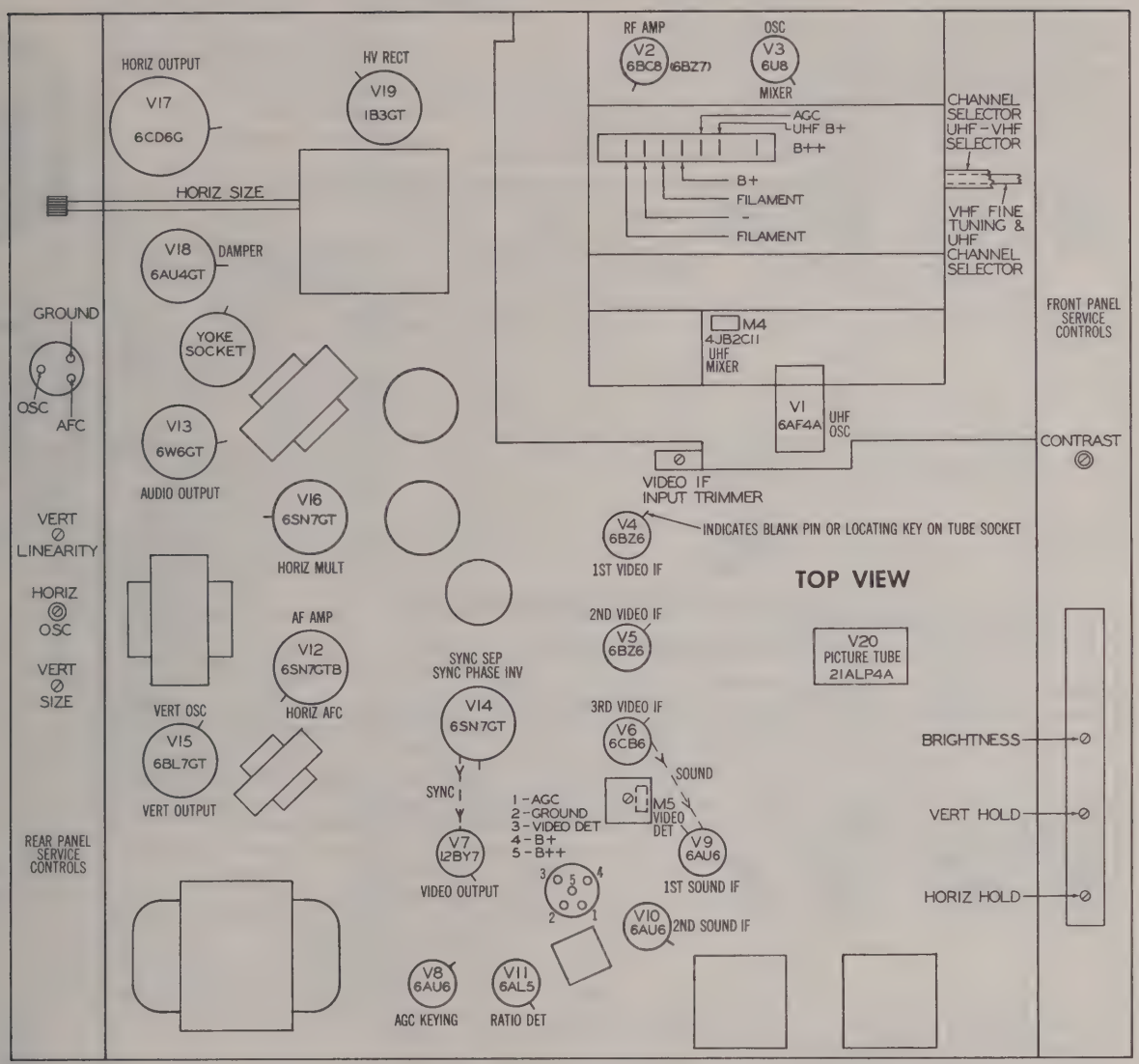
MOTOROLA MODELS Y21K37B, BA, BR, BRA, Y21K39, B, Y21K40, B, Y21T26B, BA, BR, BRA, CH, CHA, Y21T27B, MA, PK, Y21T28, B, 21K37B, BA, BR, BRA, 21K39, B, 21K40, B, 21T26B, BA, BR, BRA, CH, CHA, 21T27B, MA, PK, 21T28, B (Ch. T5-534, Y, YB)



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

MOTOROLA MODELS V21KG7B, BA, BR, BRA, V21KG9, B, V21KK0, B, V21T26B, BA, BR, BRA, CH, CHA, V21T27B, MA, PK, V21T28, B, 21KG7B, BA, BR, BRA, 21KG9, B, 21KK0, B, 21T26B, BA, BR, BRA, CH, CHA, 21T27B, MA, PK, 21T28, B (CH, T5-534, Y, YB)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, V6, V13 (V1 UHF only)**
No pic, no sound, has snow - **V2, V3, V4**
No pic, has sound, has raster - **V7, V8, V20**
Has pic, no sound - **V9, V10, V11, V12, V13**
Overloaded picture - **V8**

SYNC FAILURE
No vert. sync - **V14, V15**
No horiz. sync - **V12, V14, V16**
No vert. or horiz. sync - **V14**

SWEEP FAILURE
No raster, has sound - **V16, V17, V18, V19, V20**
No vertical deflection - **V15**
Poor vert. linearity or foldover - **V15**
Poor horiz. linearity or foldover - **V16, V17, V18**
Narrow picture - **V16, V17, V18, V19, M1, M2**
Vert. off freq. - **V14, V15**
Horiz. off freq. - **V12, V14, V16**

MOTOROLA MODELS Y21K37B, BA, BR, BRA, Y21K39, B, Y21K40, B, Y21T26B, BA, BR, BRA, CH, CHA, Y21T27B, MA, PK, Y21T28, B, 21K37B, BA, BR, BRA, 21K39, B, 21K40, B, 21T26B, BA, BR, BRA, CH, CHA, 21T27B, MA, PK, 21T28, B (Ch. T5-534, Y, YB)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by disconnecting the yoke socket. The possibility of RF interference during alignment is also eliminated by this procedure.
Connect a 25000/25 watt resistor from positive side of C3A to chassis.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Connect the negative lead of a 6 volt bias supply to pin 1 of the test receptacle on the IF strip. Connect the positive lead to chassis.
Local oscillator may be disabled by connecting a clip lead from pin 9 (grid) of the osc-mixer tube (V2) to chassis. If sweep generator has no built-in markers, loosely couple the output of an accurately calibrated AM generator to high side of sweep generator output.
Attenuate sweep generator output to maintain 2 to 5 volts peak to peak on scope.
Preset adjustment A7 maximum clockwise. The IF coils and traps have two points of resonance. The correct settings are with the cores away from the center of the coil form so as not to affect coupling between coil and trap windings.
Set area selector switch to its local position.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.005MFD	High side to pin 1 (grid) of first video IF amplifier tube (V4). Low side to chassis.	44MC (10MC Swp.)	42.25	Any non-interfering channel	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis.	A1	Adjust A1 to place 42.25MC marker on response curve as in Fig. 1. Correct position of adjustment is with core farthest from chassis end of coil.
2.	"	"	"	45.75MC	"	"	A2, A3	Connect a clip lead across R30. Adjust A2 to place 45.75MC marker on response curve as in Fig. 1. Correct adjustment of A3 is with core farthest from chassis end of coil. Adjust A3 to position center portion of curve for MINIMUM tilt and dip. Correct adjustment of A3 should be with core nearest chassis end of coil.
3.	"	High side to point Ⓑ. Low side to chassis.	"	41.25MC 42.25MC 45.75MC	"	"	A4, A5, A6	Adjust A4 and A5 to place markers (42.25MC and 45.75MC) 30% down as in Fig. 2. Increase generator output to observe 41.25MC trap notch. Adjust A6 to place 41.25MC marker in trap notch as in Fig. 2.
4.	"	"	"	41.25MC 42.25MC 45.75MC	"	"	A7	Adjust A7 for response curve similar to Fig. 3 with correct marker position as shown in Fig. 3. Remove short from across R30.

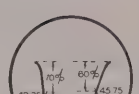


FIG 1

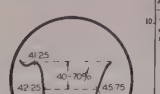


FIG 2

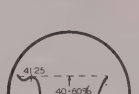


FIG. 3

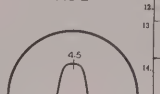


FIG.4

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Set contrast control at maximum contrast position.
If a 4.5MC signal of crystal accuracy is not available, a TV station signal may be used.
VTVM connections and adjustments of A8 thru A11 should be made as in steps 5 and 6.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe to point Ⓓ. Common to chassis.	A8, A9, A10	Adjust for maximum deflection with VTVM set to 5 volt scale. Attenuate generator as necessary.
6.	"	"	"	"	DC probe to point Ⓓ. Common to chassis.	A11	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 150V sawtooth voltage in scope for horizontal deflection.
Set contrast control at maximum contrast position.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.01MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (450KC Swp.)	4.5MC	Any non-interfering channel	Vert. Amp. to point Ⓒ. Low side to chassis.	A8, A9, A10	Disconnect stabiliser capacitor (C5). Adjust for curve of maximum amplitude and symmetry as in Fig. 4.
6.	"	"	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A11	Reconnect C5. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 5. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines.

FIG. 6

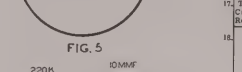


FIG. 7

4.5MC TRAP ALIGNMENT

Set contrast control at maximum contrast position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe thru detector (Fig. 6) to pin 11 (cathode) of picture tube. Low side to chassis.	A12	Adjust for MINIMUM deflection on VTVM.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a local TV station. Adjust the fine tuning control until a noticeable 4.5MC beat appears in the picture. Adjust A12 for minimum 4.5MC beat in the picture. Adjust A12 so that core is approximately centered between the points where the 4.5MC beat appeared in the picture.

VHF RF AND MIXER ALIGNMENT

Adjust the oscilloscope for a 2 inch deflection with 1.5 volt peak to peak signal.
If sweep generator has no built-in marker, loosely couple a separate marker generator to the antenna terminals.
Adjustments A17, A18, A19 and A21 thru A32 are adjusted by expanding or compressing coil turns.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp.)	211.25MC 215.75MC	13	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis.	A13, A14	Preset adjustments A15 and A16 at mid-capacity. Preset adjustment A40 for maximum inductance (core fully clockwise). Preset A30 for MINIMUM inductance (core fully counter clockwise). Adjust A13 and A14 for maximum amplitude and response similar to Fig. 7.
9.	"	"	177MC (10MC Swp.)	175.25MC 179.75MC	7	"	A15, A16	Adjust for maximum amplitude, correct tilt, and correct marker position as in Fig. 7.

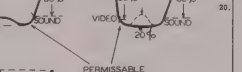


FIG. 7

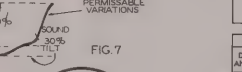


FIG 8

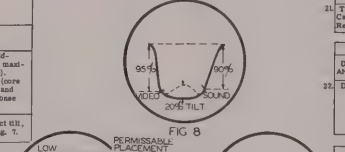


FIG. 9

FIG.10

VHF RF AND MIXER ALIGNMENT (Cont.)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp.) 201MC (10MC Swp.) 195MC (10MC Swp.) 189MC (10MC Swp.) 183MC (10MC Swp.)		12 11 10 9 8	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis.		Check for response curve on each channel. If response is not within limits on each channel, repeat steps 8 and 9. If necessary, make compromise adjustments of A13 thru A16.
11.	"	"	85MC (10MC Swp.)	83.25MC 87.75MC	6	"	A17, A18, A19	Adjust A17, A18 and A19 in this order for response curve similar to Fig. 8. Adjust A17 and A18 for correct marker position. Adjust A19 for maximum gain and MINIMUM tilt.
12.	"	"	"	87.75MC	6	"	A20	Adjust A20 until response curve is just effected at sound marker point.
13	"	"	79MC (10MC Swp.)	77.25MC 81.75MC	5	"	A21, A22, A23	Adjust for response curve similar to Fig. 8. Adjust A21 and A22 for correct marker positions and A23 for maximum gain and MINIMUM tilt.
14.	"	"	69MC (10MC Swp.)	67.25MC 71.75MC	4	"	A24, A25 A26	Adjust for response curve similar to Fig. 8. Adjust A24 and A25 for correct marker positions and A26 for maximum gain and MINIMUM tilt.
15.	"	"	63MC (10MC Swp.)	61.25MC 65.75MC	3	"	A27, A28 A29	Adjust for response curve similar to Fig. 8. Adjust A27 and A28 for correct marker positions and A29 for maximum gain and MINIMUM tilt.
16.	"	"	57MC (10MC Swp.)	55.25MC 59.75MC	2	"	A30, A31, A32	Adjust for response curve similar to Fig. 8. Adjust A30 and A31 for correct marker positions and A32 for maximum gain and MINIMUM tilt.

VHF OSCILLATOR ALIGNMENT

Replace the 6 volt bias as under "Video IF Alignment". Use only enough sweep generator output from geserator to produce useable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp.)	209.75MC	12	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis.	A33	Preset adjustment A34 at mid-capacity. Adjust A33 to place sound marker in sound trap as in Fig. 9.
18.	"	"	213MC (10MC Swp.) 207MC (10MC Swp.) 201MC (10MC Swp.) 195MC (10MC Swp.) 189MC (10MC Swp.) 183MC (10MC Swp.) 177MC (10MC Swp.)	215.75MC 209.75MC 203.75MC 197.75MC 191.75MC 185.75MC 179.75MC	13 12 11 10 9 8 7	"	A34	Check channels 7 thru 13 noting if sound marker for each channel falls just above the trap notch. If more than a 30 degree rotation of fine tuning control is necessary to place sound marker in proper position on any high band, set sweep and marker generator for channel 7 frequency and adjust A34 to place sound marker in trap notch as in Fig. 9.
19.	"	"	213MC (10MC Swp.)	215.75MC	13	"	A33	Check for correct sound marker position as in Fig. 9. If necessary, readjust A33 to place sound marker in trap notch.
20.	"	"	85MC (10MC Swp.)	87.75MC	6	"	A35	Adjust to place sound marker in sound trap as in Fig. 9. A35 thru A39 are adjusted by expanding or compressing coil turns.
			79MC (10MC Swp.)	81.75MC	5		A36	
			69MC (10MC Swp.)	71.75MC	4		A37	
			63MC (10MC Swp.)	65.75MC	3		A38	
			57MC (10MC Swp.)	59.75MC	2		A39	

45.0MC TRAP ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
21.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	49MC (10MC Swp.)	45MC	2	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis.	A40	Increase sweep generator output to produce visible marker on scope. Adjust A40 for MINIMUM response at 45MC.

UHF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
22.	Direct	High side to point Ⓑ. Low side to chassis.	44MC (10MC Swp.)	41.25MC 45.75MC	UHF	Vert. Amp. to point Ⓑ. Low side to chassis.	A41, A42, A43	Adjust A41, A42, and A43 for response similar to Fig. 10. Adjust A41 and A42 for correct marker position and A43 for maximum gain and MINIMUM tilt. A41 and A42 are adjusted by expanding or compressing coil turns.

IF SENSITIVITY MEASUREMENT

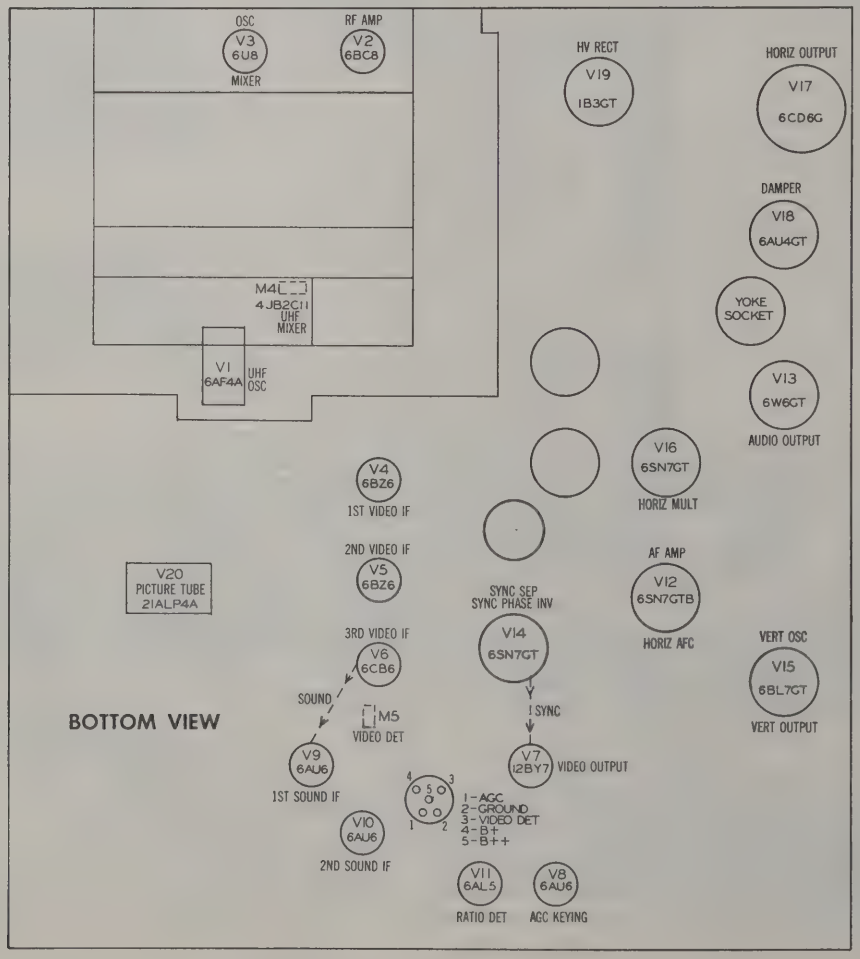
Set the contrast control for minimum contrast. Disable the horizontal sweep circuit as under "Pre-alignment Instructions".
Set the local-distance switch to "distance-position". Set channel selector to channel 13. Connect the high side of an AM signal generator thru a .001 MFD to pin 1 (grid) of first video IF amplifier tube (V4). Low side to chassis. Set signal generator to 45.0MC.
Connect the DC probe of a VTVM to point Ⓓ. Common to chassis.
A signal of less than 400 microvolts from the generator should produce one volt on VTVM. Short out R30 with a clip lead and move high side of signal generator to point Ⓑ. Low side to chassis. A signal of less than 80 microvolts from the generator should produce one volt on VTVM. Remove short from R30.

MOTOROLA MODELS Y21K37B, BA, BR, BRA, Y21K39, B, Y21K40, B, Y21T26B, BA, BR, BRA, CH, CHA, Y21T27B, MA, PK, Y21T28, B, 21K37B, BA, BR, BRA, 21K39, B, 21K40, B, 21T26B, BA, BR, BRA, CH, CHA, 21T27B, MA, PK, 21T28, B (CH. TS-534, V, VB)

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4A	*■ 2. 7KΩ	20KΩ	. 1Ω	0Ω	0Ω	20KΩ	*■ 2. 7KΩ		
V 2	6BC8	INF	2. 5Meg	0Ω	0Ω	. 1Ω	† 2. 5KΩ	INF	INF	0Ω
V 3	6U8	■ 4. 8KΩ	15KΩ	■ 220KΩ	. 1Ω	0Ω	■ 1KΩ	0Ω	0Ω	15KΩ
V 4	6BZ6	330KΩ	47Ω	0Ω	. 1Ω	▲ 220Ω	▲ 220Ω	0Ω		
V 5	6BZ6	85KΩ	▲ 18Ω	0Ω	. 1Ω	† 300Ω	† 300Ω	INF		
V 6	6CB6	1. 2KΩ	120Ω	. 1Ω	0Ω	† 8. 2KΩ	† 40KΩ	0Ω		
V 7	12BY7	45Ω	3. 9KΩ	45Ω	0Ω	0Ω	. 1Ω	■ 5KΩ	■ 470Ω	45Ω
V 8	6AU6	■ 220KΩ	60KΩ	. 1Ω	0Ω	2Meg	† 52Ω	60KΩ		
V 9	6AU6	2. 4Ω	0Ω	. 1Ω	0Ω	■ 10KΩ	■ 10KΩ	150Ω		
V 10	6AU6	15KΩ	0Ω	. 1Ω	0Ω	■ 10KΩ	■ 10KΩ	150Ω		
V 11	6AL5	INF	INF	. 1Ω	0Ω	6. 8KΩ	0Ω	6. 8KΩ		
V 12	6SN7GTB	300KΩ	† 33KΩ	1. 5KΩ	320KΩ	22KΩ	120KΩ	. 4Ω	. 1Ω	
V 13	6W6GT	NC	0Ω	† 255Ω	† 52Ω	† 33KΩ	NC	. 1Ω	60KΩ	
V 14	6SN7GT	1. 8Meg	■ 1Meg	45Ω	22KΩ	■ 9. 5KΩ	2. 2KΩ	. 1Ω	0Ω	
V 15	6BL7GT	◓ 3. 5Meg	◓ 900Ω	7KΩ	550KΩ	◓ 3. 5Meg	50Ω	. 1Ω	0Ω	
V 16	6SN7GT	120KΩ	† 70KΩ	1KΩ	5Meg	† 11KΩ	1KΩ	. 1Ω	0Ω	
V 17	6CD6G	TP	. 1Ω	0Ω	TP	1Meg	TP	0Ω	■ 1KΩ	TOP CAP ◓ 31Ω
V 18	6AU4GT	NC	TP	200KΩ	NC	†55Ω	TP	0Ω	. 1Ω	
V 19	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ◓ 196Ω
V 20	21ALP4A	0Ω	■ 3. 5Meg	PIN 6 ◓ 18Ω	PIN 10 ◓ 18Ω	PIN 11 ■ 110KΩ	PIN 12 . 1Ω			

* MEASURED IN "UHF" POSITION.
■ MEASURED FROM 145V LINE.
▲ MEASURED FROM PIN 7 OF V5.
◓ MEASURED FROM PIN 3 OF V18.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART

PRODUCTION CHANGES

In later production the following models, chassis and production chages were made. Whenever possible the reason for the change is also made.

MODEL	CHASSIS	MODEL	CHASSIS
Y21K48B	TS-534Y	21K48M	TS-534
Y21K48M	TS-534Y		VTS-534
21K48B	TS-534		WTS-534

TV CHASSIS CODING SYSTEM

TS-534A-00 ..... ORIGINAL chassis

A-01, 02, etc ..... MINOR ELECTRICAL REVISIONS of the "A" chassis.

A-01-0, A-02-1, etc. ..... DEVIATIONS from minor electrical revisions.

B-00 ..... FIRST MAJOR REVISION of the original chassis.

B-01, -02, etc ..... MINOR ELECTRICAL CHANGES of the "B" chassis.

C-00 ..... SECOND MAJOR REVISION of the original chassis.

C-01, -02, etc. ..... MINOR ELECTRICAL CHANGES of the "C" chassis.

D-00 ..... THIRD MAJOR REVISION of the original chassis.

D-01, -02, etc. ..... MINOR ELECTRICAL CHANGES of the "D" chassis.

Prefixes such as VTS-534, WTS-543 are for mechanical changes.

A "Y" suffix added to the basic chassis (for example TS-534AY-00) indicates that the chassis contains a factory installed UHF tuner.

Ch. TS-534A-02

When R32 is increased from 15KΩ to 18KΩ the tuners are changed to part #TT-79B and TT-80B.

Ch. TS-534C-00

TO DECREASE HORIZONTAL PICK-UP

The video IF circuit is revised. A partial schematic is given on page 17 showing the new arrangement.

TO PREVENT A LINGERING SPOT ON THE PICTURE TUBE

R60 is increased from 22KΩ to 68KΩ and removed from the 245 volt line and connected to ground.

C73 is decreased from a .05MFD to a .01MFD.

TO IMPROVE TONE QUALITY

C91 is decreased from a .01MFD to a .0047MFD.

TO ELIMINATE PARASITIC OSCILLATIONS

A 100Ω resistor is added from pin 3 of V13 to the blue lead of the audio output transformer (T6).

Ch. TS-534C-01

TO IMPROVE CONTRAST

An 18Ω resistor is added from the center arm of the contrast control (R4A) to ground.

C117 is increased from 470MMF to a .01MFD.

Ch. TS-534C-02

TO CORRECT VERTICAL LINE STRUCTURE

A shielded lead is added in place of the unshielded lead connecting between the horizontal hold control (R1) and R108.

Ch. TS-534C-03

COMPONENT CHANGE

L48 is omitted and C114 is then connected directly to pin 6 of the deflection yoke (T5).

Ch. TS-534D-00

TO REDUCE ADJACENT CHANNEL INTERFERENCE

A 47.25MC trap is added in the grid circuit of the first video IF stage.

TO IMPROVE VIDEO IF ALIGNMENT

An improved converter circuit is used. With this change the tuners change to part #TT-79C and TT-80C. A partial schematic is given on page 17 showing the new arrangement.

Ch. TS-534D-01

The part number of C1 is changed.

Ch. TS-534D-02

R115 is decreased from 1KΩ to 680Ω.

CONTINUED ON PAGE 12.

PRODUCTION CHANGES (cont)

Ch. TS-534D-03	TO INCREASE AUDIO SENSITIVITY R70 is omitted. A shield is added under the ratio detector transformer (L44). The components are relocated and dressed close to the chassis.
Ch. TS-534D-04	TO PREVENT CAPACITOR BREAKDOWN The negative side of C6 is removed from the junction of C2C, R95 and R6 , and reconnected to the 245 volt line. ELECTROLYTIC ADDED A 20MFD, 500V electrolytic capacitor (part #23K710667) is added from the high side of the vertical linearity control (R6) to the 245 volt line.
Ch. TS-534D-05	TO REDUCE SLIPPAGE To reduce slippage, tension is applied to the drive belt by adding a roller and spring assembly. This change applies only to UHF models.
Ch. TS-534D-06, -0	TO IMPROVE CONTRAST The video amplifier circuit has been revised. A partial schematic is shown on page 17. COMPONENT CHANGE R115 is increased from 680Ω to 1KΩ.
Ch. TS-534D-07, -0	COMPONENT CHANGE The 470Ω resistor added across the contrast control (R4A) in change "D-06" is decreased to 220Ω. R115 is decreased from 1KΩ to 680Ω. In change "D-07-0", R115 is increased to 1KΩ.
Ch. TS-534D-08, -0	TO REDUCE FILAMENT VOLTAGE ON 1B3 R118 is increased from 3.3Ω to 4.7Ω. R115 is decreased to 680Ω. In change "D-08-0" R115 is increased to 1KΩ.
Ch. TS-534D-09, -0	TO IMPROVE SYNC The AGC circuit has been revised. A partial schematic is shown on page 17 showing the new arrangement. In change "D-09-0", R115 is increased to 1KΩ.

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT	
V1	UHF Oscillator	6AF4A	6AF4A	
V2	RF Amplifier	6BC8	6BC8	6BZ7 may be used as an alternate
V3	Mixer-Oscillator	6U8	6U8	
V4	1st. Video IF Amplifier	6BZ6	6BZ6	
V5	2nd. Video IF Amplifier	6BZ6	6BZ6	
V6	3rd. Video IF Amplifier	6CB6	6CB6	
V7	Video Output	12BY7	12BY7	
V8	AGC Keying	6AU6	6AU6	
V9	1st. Sound IF Amplifier	6AU6	6AU6	This stage not used in all versions
V10	2nd. Sound IF Amplifier	6AU6	6AU6	
V11	Ratio Detector	6AL5	6AL5	
V12	AF Amplifier-Horiz. AFC	6SN7GTB	6SN7GTB	
V13	Audio Output	6W6GT	6W6GT	
V14	Sync Separator-Sync Phase Inverter	6SN7GT	6SN7GT	
V15	Vert. Oscillator-Vert. Output	6BL7GT	6BL7GT	
V16	Horiz. Mult.	6SN7GT	6SN7GT	
V17	Horiz. Output	6CD6G	6CD6G	
V18	Damper	6AU4GT	6AU4GT	
V19	HV Rectifier	1B3GT	1B3GT	Do not use 1B3GT tube with internal connection between pins 3 and 7.

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	MOTOROLA PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V20	21ALP4A	21ALP4A ① 21ALP4 21ALP4B ① 24DP4A ①	21ALP4A ① 21ALP4	21ALP4A ② 21ALP4 21ALP4B ② 21ALP4A/B ②	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	■140	150	23B737620	AFHS1-70	XA004	FP117	TM-140-150	T-055	TVL-1428
C2A	▲140	150	23B731523		XB008	FP216.3	TM-3125	D-090	
B	■200	150			BR6045	TC68		MTD-4530	
C	▲60	200							
C3A	▲200	150	23B710941	AFHS2-109	B078	FP216.1	TM-2029	D-088	TVL-2444
B	▲5	150							
C4A	■30	150	23B736968	AFH3-06	C005	FP259	TM-2003	D-045	TVL-3435
B	▲10	50							
C5	3	50	23A690543	PRS150V4	BBR4-50	TC30	TD-4-50	MMT-0505	TVA-1303
C6	10	500	23K731537 (Note 1)	PRS500V10	BR1250	TC82	TD-10-500	S-315	TVA-1905

Note 1. Some versions use 20MFD in this application (part #23K737706).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C7	470	2000	21R115856	HVD-30-470	DD30-471	V2T47	3KV-471	DC30347	20GA-T47	
C8	470	2000	21R115856	HVD-30-470	DD30-471	V2T47	3KV-471	DC30347	20GA-T47	
C9	27		21A731037							
C10	100		21R120806							
C11	100		21R120806							
C12	15			SI15	DD-150	G021	831-150	UC-5415	5GA-Q15	
C13	470		21R114554	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C14	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C15	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C16	22		21R120539							
C17	22		21R120539							
C18	470		21R410121	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C19	220		21R410115	BPD-00022	DD-221	G051	811-221	UC-5322	5GA-T22	
C20	10000		21R482726	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C21	1000		21R115386	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C22	2.2		21R115948	NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C23	10		21R121114	N750-DI10	TCN-10	N018	N750A-100	NT-541	5TCU-Q1	
C24	150		21R410112	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C25	.5-3		21K735985		829-3		3115-01-0R5	CT565A		
C26	.56		21A735622							
C27	.75		21K735623					ZT-5675		
C28	2.2		21R115948	NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C29	150		21R410112	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C30	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C31	22		21R120539							
C32	22		21R120539							Note 2
C33A	1500		21R120098	BPD-2X0015	DD2-152	DK071	812-0015	DCD-5215	5HK-2D15	Note 2
B	1500									Note 2
C34	.5-3		21K735985		829-3		3115-01-0R5	CT565A		
C35	1		21R114071							
C36	2.2		21R115948	NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C37	.5-3		21K735985		829-3		3115-01-0R5	CT565A		
C38	12		21R121110							
C39	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C40A	800		21R400943	BPD-2X001	DD2-102	DK069	812-001	DCD-521	5HK-2D1	
B	800									
C41	470		21R114554	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C42	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	Note 3
C43	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C44	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C45	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C46	470		21R114554	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C47	470		21R114554	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C48	1		21R115958	NP0-SI1	TCZ-1	TZ03	NP0A-010		5TCCB-V1	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No	RATING CAP	RATING VOLT	REPLACEMENT DATA MOTOROLA PART No	AEROVOX PART No	CENTRALAB PART No	CORNELL DUBILIER PART No	IRC PART No.	MALLORY PART No	SPRAGUE PART No	NOTES
C49	33		21R120539							
C50	1000		21R122549	EF-001	MFT-1000				503C-D1	
C51	470		21R114594	BPD-00047	DD-471	K080	831-471	UC-5347	5GA-T47	
C52	1000		21R115398	BPD-001	DD-102	K089	801-001	DC-531	5HK-D1	
C53	25	100	8K123045	PZ88N-25		CUB2P25		PT4025	2TM P25	
C54	25	200	8K13B175	PZ88N-25		CUB2P25		PT4025	2TM-P25	
C55	500		21R130936	SS50	DD-561	G083	831-561	UC-5356	5GA-T56	
C56	470		21R140131	BPD-00047	DD-471	K080	831-471	UC-5347	5GA-T47	
C57	470		21R114594	BPD-00047	DD-471	K080	831-471	UC-5347	5GA-T47	
C58	1000		21R115398	BPD-001	DD-102	K089	801-001	DC-531	5HK-D1	
C59	470		21R114594	BPD-00047	DD-471	K080	831-471	UC-5347	5GA-T47	
C60	1000		21R115398	BPD-001	DD-102	K089	801-001	DC-531	5HK-D1	
C61	1000		21R115398	BPD-001	DD-102	K089	801-001	DC-531	5HK-D1	
C62A,B	800		21R400643	BPD-EZ001	DD-H02	DK089	R12-001	DCD-531	5HK-ED1	
B	800									
C63	33		21R120539							
C64	33		21R120539							
C65	.1	200	8R115879	PZ88N-1	DF-104	CUB2P1		PT401	2TM-P1	
C66	5000		21R121823	BPD-005	DD-502	K080	81-U05	DC-535	5HK-D5	
C67	68		21R119896							
C68	27		21R119896							
C69	.1	200	8R115879	PZ88N-1	DF-104	CUB2P1		PT401	2TM-P1	
C70	10000		21R482738	BPD-01	DD-103	K083	81-U1	DC-51	5HK-B1	
C71	5000	2000	21R130098	RVD-30-4706		VID5			20GK-D5	
C72	.05	400	8R115867	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C73	.05	400	8R121587	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C74	470		21R121797	BPD-00047	DD-471	K080	831-471	UC-5347	5GA-T47	
C75	.35	300	8K121575	PZ88N-25		CUB2P25		PT4025	2TM-P25	
C76	.35	200	8K121575	PZ88N-25		CUB2P25		PT4025	2TM-P25	
C77	3.3		21R125948	BPD-SE3.3	TC2-2R2	T2Y5	MP0A-2R2		YTC1B-V22	
C78	18		21R120578							
C79	5000		21R115301	BPD-005	DD-502	K080	81-U05	DC-535	5HK-D5	
C80	5000		21R115318	BPD-005	DD-502	K080	81-U05	DC-535	5HK-D5	
C81	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5315	5HK-D15	
C82	5000		21R115318	BPD-005	DD-502	K080	81-U05	DC-535	5HK-D5	
C83	5000		21R115318	BPD-005	DD-502	K080	81-U05	DC-535	5HK-D5	
C84	5000		21R115318	BPD-005	DD-502	K080	81-U05	DC-535	5HK-D5	
C85	470		21R121797	BPD-00047	DD-471	K080	831-471	UC-5347	5GA-T47	
C86	470		21R121797	BPD-001	DD-102	K089	801-001	DC-531	5HK-D1	
C87	5000		21R121797	BPD-005	DD-502	K080	81-U05	DC-535	5HK-D5	
C88	3300		21R120423	BPD-0033	D6-332	K077	81-U033	UC-5333	5HK-D33	
C89	5000		21R115318	BPD-005	DD-502	K080	81-U05	DC-535	5HK-D5	
C90	.18	400	21R121774	P488N-15		CUB4P15		PT4015	4TM-P15	
C91	.01	400	8K754833	BPD-01	D6-103	CUB4S1	GP3-333-103	PT415	4TM-S1	
C92	.01	1000	8R121760	P968N-01	D6-103	CUB5S1		PT451	M8-S1	
C93	4700		21R120149	BPD-0047	DD-472	K079	81-U047	DC-525	5HK-D47	
C94	220		21R120430	BPD-00022	DD-221	G051	81-U21	DC-5322	5HK-D22	
C95	.05	400	8R121587	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C96	.0047	400	8K754834	BPD-0047	D6-472	CUB4D47	GP3-333-472	PT2547	5TM-D47	
C97	.0047	400	8K754834	BPD-0047	D6-472	K080	GP3-333-472	PT2547	5TM-D47	
C98	.01	400	8K754833	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C99	4700		21R120149	BPD-0047	DD-472	K079	81-U047	DC-525	5HK-D47	
C100	.05	400	8R121587	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C101	.05	400	8R121587	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C102	470		21R410121	BPD-00047	DD-471	K080	831-471	UC-5347	5GA-T47	
C103	10000		21R120121	BPD-001	DD-103	K083	801-001	DC-531	5HK-B1	
C104	.001	1000	8R123104	RVD-15-1000	DD-102	CUB5D1	1R5KV-102	DC3021	MB-D1	
C105	3300		21R120423	813300	D6-332	K077	81-U033	UC-5333	5HK-D33	
C106	3300		21R120423	813300	D6-332	K077	81-0633	UC-5333	5HK-D33	
C107	.01	400	21R121945	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C108	.0047	400	8K754834	1484-0047		CUB4D47	1R5DV	MC3405	M8-S47	
C109	100		21R400637	1489-0001	DD-101	5R5T1		MC3535	M8-S1	
C110	390		21R135787	1489-00039	D6-391	5R5T39	81-391	MC3543	M8-S39	
C111	390		21R135787	1489-00039	D6-391	5R5T39	81-391	MC3543	M8-S39	
C112	5000		21R115313	BPD-005	DD-502	K080	81-U05	DC-535	5HK-D5	
C113	470	2000	21R121478	HVD-30-470	DD30-471	V274Y		3KY-471	20GA-T47	
C114	100	2000	21R123536	HVD-30-100	DD30-101	V27I		3KY-101	20GA-T1	
C115	100	2000	21R123536	HVD-30-100	DD30-101	V27I		3KY-101	20GA-T1	
C116	82	2000	21R120150		DD30-820				20GA-Q82	
C117	470	2000	21R121478	HVD-30-470	DD30-471	V274Y		3KY-471	20C30347	30GA-T47

Note 1. Part No. 18K737347 used in some versions.
Note 2. Part No. 18K737346 used in some versions,
* Connect a 330KΩ resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
Note 3. Part No. 18K737345 used in some versions.
† Connect a 1Meg resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
‡ Concentrikit Equivalent, K-2 Kit, Base Elements and Shafts, B11-103, P10-110 (Panel)
B13-187X, B21-201 (Rear)
T6-1 (Switch)

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA MOTOROLA PART No	CENTRALAB PART No	CLAROSTAT PART No	IRC PART No.	MALLORY PART No	INSTALLATION NOTES
R1A	100KΩ	½	18K735230	AB-40	A47-100K-S	Q11-128	TAP15L	Horiz. Hold-See Note 1
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R1A.
R2A	850KΩ	½	18K733417	AB-59 *	A47-500K-S	Q11-133 *	TAP25L *	Vert. Hold-Note 2-Stop at 500KΩ
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R2A.
R3A	5Meg	½	18K735415	AB-87	A47-5Meg-S	Q11-141	TAP5EL	Brightness-Note 3
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R3A.
R4A	350Ω	½	18B735125	F1-0	RTV-549	QJ-872 †	UF52L	Contrast (Panel)
B	1Meg	½		R2-03			UB16-T35	Volume Tap at 200KΩ (Rear)
C	Switch			A1-1			US-26	Attach to R4B.
R5A	5Meg	½	18B735413	AB-87 †	A45Meg6-S	Q11-141 †	TAP5EL	Vert. Size-Stop at 5Meg
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R5A.
R6A	750Ω	½	18K735414	AB-5	A45-750-S	Q11-105	TAP75L	Vertical Linearity
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R6A.

Note 1. Part No. 18K737347 used in some versions.
Note 2. Part No. 18K737346 used in some versions,
* Connect a 330KΩ resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
Note 3. Part No. 18K737345 used in some versions.
† Connect a 1Meg resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
‡ Concentrikit Equivalent, K-2 Kit, Base Elements and Shafts, B11-103, P10-110 (Panel)
B13-187X, B21-201 (Rear)
T6-1 (Switch)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MOTOROLA PART No.	IRC PART No.	NOTES
R7	1Meg	½		BTS-1Meg	
R8	1Meg	½		BTS-1Meg	
R9	270KΩ	½		BTS-270K	
R10	56KΩ	½		BTS-56KΩ	
R11	18KΩ	½			
R12	270KΩ	½		BTS-2700	
R13	150Ω	½		BTS-150	
R14	150Ω	½		BTS-150	
R15	390Ω	½	6R5564	BTS-390	
R16	68Ω	½	6R6040	BTS-680	Note 2
R17	68Ω	½	6R6040	BTS-680	
R18	39Ω	½	6R5564	BTS-390	
R19	1Meg	½	6R6004	BTS-1Meg	
R20	1Meg	½	6R6004	BTS-1Meg	
R21	22KΩ	½	6R6028	BTS-22K	
R22	47KΩ	½	6R6035	BTS-47K	
R23	10KΩ	½	6R6054		
R24	1000Ω	½	6R6301	BTS-1000	
R25	1000Ω	½	6R6301	BTS-1000	
R26	15KΩ	½	6R2119		
R27	4700Ω	½	6R6039	BTS-4700	
R28	1000Ω	½	6R6301	BTS-1000	
R29	15KΩ	½	6R2119		
R30	4700Ω	½	6R6039	BTS-4700	
R31	10KΩ	½	6R6054	BTS-10K	
R32	18KΩ	½	6R3361		Note 1
R33	1000Ω	½	6R6301	BTS-1000	
R34	330KΩ	½	6R6015	BTS-330K	
R35	2700Ω	½		BTS-2700	
R36	1800Ω	½	6R5700	BTA-1800	
R37	1000Ω	½	6R6301	BTS-1000	
R38	330Ω	½	6R3323	BTS-330	
R39	47Ω	½	6R5550	BTS-47	
R40	15KΩ	½	6R6047		
R41	220Ω	½	6R3953	BTS-220	
R42	220Ω	½	6R3953	BTS-220	
R43	18Ω	½	6R5551	BTS-18	
R44	150KΩ	½	6R6388	BTS-150K	
R45	150KΩ	½	6R6388	BTS-150K	
R46	47KΩ	½	6R6048	BTS-47K	
R47	330KΩ	½	6R3396	BTS-330K	
R48	330Ω	½	6R6393	BTS-1300	
R49	620Ω	½	6R20579		
R50	330Ω	½	6R3953	BTA-330	
R51	100Ω	½	6R6301	BTS-1000	
R52	15Ω	½	6R5561	BTS-150	
R53	390Ω	½	6R6559	BTS-3900	
R54	3300Ω	½	6R6038	BTS-3300	Note 5
R55	33KΩ	½	6R6040	BTS-33K	
R56	470Ω	½	6R5563	BTA-470	
R57	5000Ω	8	17K734189	PWV-5000	
R58	13KΩ	½	6R3248	BTS-13K	
R59	10KΩ	½	6R6399	BTS-10K	
R60	22KΩ	½	6R6567	BTS-22K	
R61	10KΩ	½	6R6054	BTS-10K	
R62	100KΩ	½	6R6031	BTS-100K	
R63	3.3Meg	½	6R3937	BTS-3.3Meg	
R64	680KΩ	½	6R6475	BTS-680K	Note 5

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MOTOROLA PART No.	IRC PART No.	NOTES
R65	470KΩ	½	6R6377	BTS-470K	
R66	180K 5%	½	6R6444	BTS-180K 5%	
R67	2.2Meg	½	6R2011	BTA-2.2Meg	
R68	1.2Meg 5%	½	6R12802	BTA-1.2Meg 5%	
R69	8.2Meg 5%	½	6R4414	BTS-8.2Meg 5%	
R70	33KΩ	½	6R6040	BTS-33K	
R71	10KΩ	½	6R6430	BTA-10K	
R72	150Ω	½	6R6373	BTS-150	
R73	15KΩ	½	6R6477	BTS-15K	
R74	10KΩ	½	6R6564	BTA-10K	Note 2
R75	150Ω	½	6R6373	BTS-150	
R76	22Ω	½	6R6370	BTS-220	
R77	33KΩ	½	6R6040	BTS-33K	
R78	6800Ω	½	6R6428	BTS-6800	Note 3
R79	6800Ω	½	6R6428	BTS-6800	Note 3
R80	68Ω	½	6R6001	BTS-68	
R81	33KΩ 5%	½	6R5758	BTA-33K 5%	
R82	750Ω 5%	½	6R400489	BTS-1500 5%	
R83	10KΩ	½	6R6330	BTS-10K	
R84	1.5Meg	½	6R3986	BTS-1.5Meg	
R85	270KΩ	½	6R6414	BTS-270K	
R86	1Meg	½	6R6046	BTS-1Meg	
R87	560KΩ	½	6R6697	BTS-560K	
R88	22KΩ	½	6R6397	BTS-22K	
R89	6800Ω	½	6R6428	BTS-6800	
R90	2700Ω	½	6R6577	BTS-2700	
R91	2200Ω	½	6R6069	BTS-2200	
R92	22KΩ	½	6R6028	BTS-22K	
R93	10KΩ	½	6R6054	BTS-10K	
R94	100Ω	½	6R6018	BTS-100	
R95	5600Ω	½	6R6317	BTS-5600	
R96	6800Ω	2	6K133012	BTS-6800	Note 4
R97	68Ω	½	6R6074	BTS-68K	Note 5
R98	560Ω	½	6R6291		
R99	560Ω	½	6R6291		
R100	100KΩ	½	6R6031		
R101	100KΩ	½	6R6031		
R102	330KΩ	½	6K122578		
R103	33KΩ	½	6R6397		
R104	100KΩ	½	6R6031		
R105	47Ω	½	17K486386	BW½-.47	
R106	4.7Meg 5%	½	6R3122		
R107	560Ω	½	6R6317	BTS-5600	
R108	82KΩ	½	6R6644	BTS-82K	
R109	680Ω	½	6R6074	BTS-68K	
R110	470Ω	½	6R6080		
R111	680Ω	½	6R6428		
R112	100Ω	½	6R6229	BTS-1000	
R113	47Ω	½	6R6397		Note 5
R114	1Meg	½	6R6046		
R115	100Ω	½	6R6227		
R116	18Ω	½	6R6231		
R117	5800Ω	½	6R400482	BTA-5800	
R118	3.3Ω	½	17K485413	BW½-3.3	
R119	6.8Ω	½	6K130590		
R120	7.5Ω	½	17A711500		
R121	3.3Meg	½	6R3937	BTS-3.3Meg	
R122	15Ω	½	6R3084	BTS-15	Note 5

Note 1. Some versions use a 15KΩ ½W resistor in this application. (Mfgr. Part No. 6R6477)
Note 2. Some versions use a 56000 ½W resistor in this application. (Mfgr. Part No. 6R5564)
Note 3. Some versions use a 10KΩ ½W resistor in this application. (Mfgr. Part No. 6R6330)
Note 4. Use heat dissipating band. If band is not used the wattage rating must be doubled.
Note 5. Not used in some versions.

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA MOTOROLA PART No.	Halldorson PART No.	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	117VAC	6.3VAC ① .82A ② 12.4A			25B736967			P6309 ①	21P24 ①	F-32A ①

① Drill new mounting holes.
② Parallel all Secondary windings.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA MOTOROLA PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Rem PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Vert. Osc. Trans.	25K736254	B6704	A-3006					
T3	Horiz. Output Trans.	24K736488 1							
T4	Vert. Output Trans.	25K736255	21804	A-3037	22X71	V315	A-8123	26S52	A-102X
T5A	Yoke(90°)Horiz.(24MH)	24D736978 ②	DF607	MDF-02	23D21	YW/F19/43	DY-18A	Y-18	Y-41-1
B	Vert. (40MH)	24D736445 ③							

1 Includes primary winding Motorola Part No. 24K737217, secondary winding Motorola Part No. 24K737218, and core Motorola Part No. 48K738112.
2 Does not include yoke retainer wedge Motorola Part No. 6A738257, nor yoke wedge clamp Motorola Part No. 42A736175.
3 Alternate deflection yoke.
4 Use original centering device & deflection yoke cover Motorola Part No. 48A721145.
5 Use original core clamp.
6 Jumper yoke terminals #3 & #6.
7 Use original horizontal damping network.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI	IMPEDANCE SEC	REPLACEMENT DATA MOTOROLA PART No	Halldorson PART No	Merit PART No.	Stancor PART No.	Thordarson PART No	Triad PART No	NOTES
T6	2.7KΩ	3.6Ω	25K736256	21001 ①	A3018	A3049	26S50	S-52	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP	REPLACEMENT DATA MOTOROLA PART No	QUAM PART No	RCA TYPE No	NOTES
SP1	5 1/4"	50Ω	3.6Ω	50K737292 ①	52E508		① Used in Models 21T26B, BA, BR, BRA, CH, CHA, Y21T26B, BA, BR, BRA, CH, CHA, 21T27B, MA, PK, Y21T27B, MA, PK
	6"	50Ω	3.6Ω	50K737756 ②	6E508		② Used in Models 21T28, B, Y21T28, B
	8"	50Ω	3.6Ω	50C737449 ③	8E508		③ Used in Models 24T38R, Y24T38R
	8"	50Ω	3.6Ω	50C733233 ④	8E508		④ Used in Models 21K37B, BA, BR, BRA, Y21K37B, BA, BR, BRA
	7"	50Ω	3.6Ω	50C737673 ⑤			⑤ Used in Models 21K39, B, Y21K39, B
							⑥ Used in Models 21K40, B, Y21K40, B
							Used in Models 24K9, B, Y24K9, B

COILS (RF-IF)

ITEM No.	USE	DC RES PRI	DC RES SEC	REPLACEMENT DATA MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No	MILLER PART No	NOTES
L1A	UHF Ant. Coupling	03CT		1V730800				Includes R7, R8, C7, C8
B	UHF RF Coupling Loop	0Ω		54B736674				
L2	Fil. Choke	0Ω		24K712254				
L3	Fil. Choke	0Ω		24K712254				
L4	Cathode Choke	0Ω		24K721430				
L5	UHF Osc. Coil	0Ω		54B735238				Less tuning core assembly
L6	UHF Osc. Coupling Coil	0Ω						Tuning core assembly part #1B730885
L7	RF Coil	0Ω						
L8	VHF Ant. Match. Trans.	.7Ω	.7Ω	24K736577				
L9	VHF Ant. Match. Trans.	.7Ω	.7Ω	24K736577				
L10	FM Trap	0Ω		24A736469				
L11	IF Trap	0Ω		24A734506				
L12	UHF IF Input Coil	0Ω		24K736960				Note 1
L13	VHF Ant.Coils	0Ω		9U6T8966				
L14	VHF Ant. Coil	0Ω		24A734859				Channel 13
L15	Fil. Choke	0Ω		24K730191				
L16	Neut. Coil	0Ω		24B721256				
L17	VHF RF Coil	0Ω		24A734731				Channel 13
L18	VHF RF Coils	0Ω		24C734957				Note 1
L19	UHF IF Coil	0Ω		24A734858				
L20	VHF Mixer Coil	0Ω		24A734733				Channel 13
L21	VHF Mixer Coil	0Ω		24K736969				Part #24K736963 used in tuner #TT-79 Note 1
L22	UHF IF Coil	0Ω		24K734969				
L23	UHF Osc. Coil	0Ω		24A736468				Channel 13
L24	VHF Osc.Coil	0Ω		24A736439				
L25	Conv. Plate	.2Ω	.1Ω	24B736259				
L26	1st. Video IF	0Ω	.1Ω	24K736370	17-4533	TV-130	6318	
L27	Shunt Peaking Coil	0Ω		24B736968		TV-131	6335	
L28	2nd. Video IF	.2Ω	.2Ω	24B736367	17-4533	TV-130	6318	1.5 Microhenries
L29	Fil. Choke	0Ω		24B736367	17-4533	TV-130	6318	
L30	Fil. Choke	0Ω		24K730191	19-1001	TV-189	6804	1.5 Microhenries
L31	Fil. Choke	.2Ω	.2Ω	24B736368	17-4533	TV-130	6318	
L32	Fil. Choke	0Ω		24K730191	19-1001	TV-189	6804	1.5 Microhenries
L33	RF Coil	0Ω		24A733853	19-1003		6806	3 Microhenries
L34	Series Peaking Coil	1.7Ω		24K118689	19-1006		6813	10 Microhenries
L35	Series Peaking Coil	5Ω		24K736961	19-3125 *		6153 *	115 Microhenries, wound on 5.6KΩ resistor
L36	Shunt Peaking Coil	1Ω		24K736963	19-4400		6136	440 Microhenries
L37	4.5MC Trap	5.8Ω		24K737215	20-1004	TV-181	1469	
L38	Series Peaking Coil	7.3Ω		24K736918	19-3250 ■	TV-185	6181 ■	946 Microhenries, Wound on 10KΩ resistor
L39	Shunt Peaking Coil	8Ω		24C736006	19-3190	TV-184	6180	176 Microhenries
L40	Shunt Peaking Coil	1Ω		24K736963	19-4400		6136	440 Microhenries
L41	Shunt Peaking Coil	18Ω		24K736496	19-4900 ▲		6187 ▲	946 Microhenries wound on 1.8KΩ resistor Alternate part #24B736734
L42	1st. Sound IF	3.4Ω		24K737343	20-1004	TV-181	1469	
L43	2nd. Sound IF	2Ω		24B735873	20-1005 ▲	TV-181 ▲	1470	
L44	Ratio Det.	4.8Ω	1.9ΩCT	24B736873	17-3497	TV-115	6305	Tertiary winding-1.1Ω
L45	RF Choke	1.7Ω		24A733335	19-1001		6813	10 Microhenries
L46	RF Choke	1.7Ω		24A733335	19-1005		6813	10 Microhenries
L47	Linearity Coil	22Ω		24A731809				Wound on .008 MFD Cap.
L48	RF Coil	8.5Ω		24B735523	19-3200		6182	336 Microhenries
L49	Series Peaking Coil			24K121739	19-1005 †		6812 †	13 Microhenries

Note 1. Used only in tuner #TT-80.
* Parallel with 6.8KΩ resistor.
■ Parallel with 10KΩ resistor.
▲ Parallel with 1.8KΩ resistor.
▲ Remove capacitor across coil.
† Parallel with 5.2KΩ resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES PRI	DC RES SEC	REPLACEMENT DATA MOTOROLA PART No	MEISSNER PART No	MERIT PART No	MILLER PART No	RCA TYPE No	Rem PART No	Thordarson PART No	NOTES
L50	42Ω		1V738152							

PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	MOTOROLA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.255ADC	48K122479	1238A	RS350	6S350	6Q4	350X	
M2	.255ADC	48K122479	1238A	RS350	6S350	6Q4	350X	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	1" piece of #26 wire							

CRYSTAL DIODES

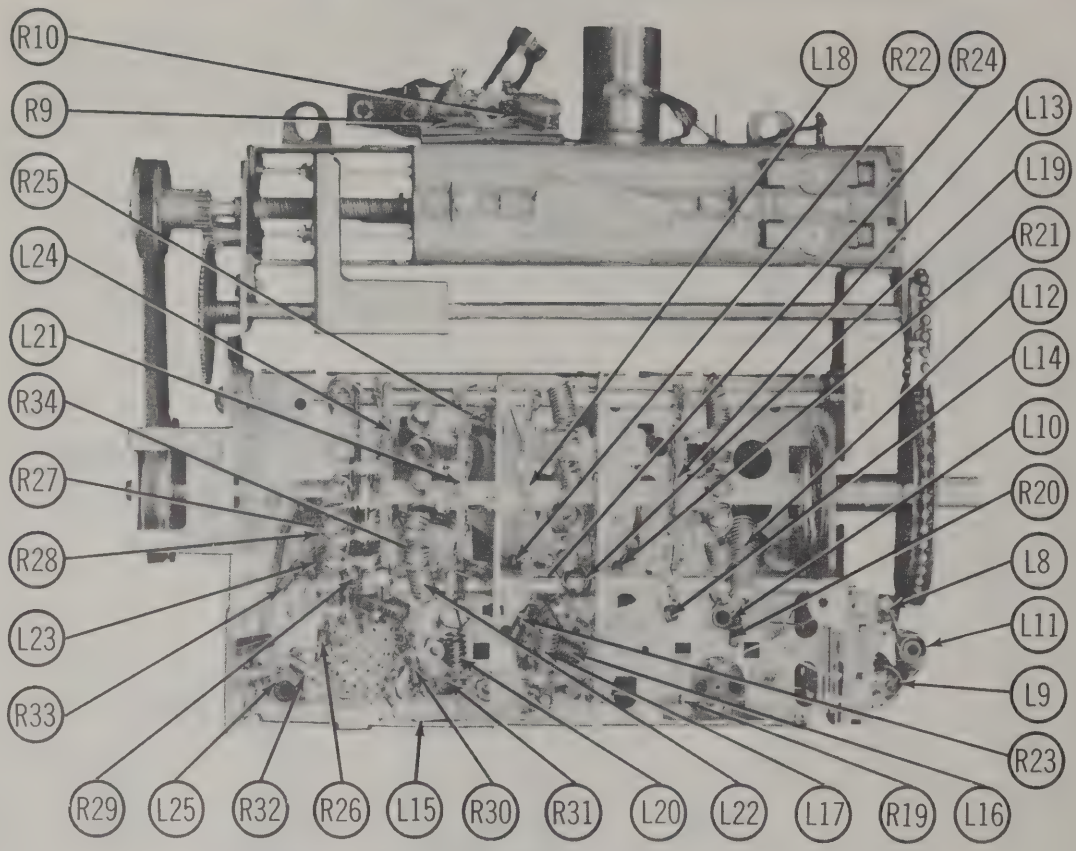
ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		MOTOROLA PART No.	SYLVANIA PART No.	
M4	4JB2C11	48K731312 *	1N82 or 1N82A	UHF Mixer (Clip-in)
M5		48K733204 †	1N60	Video Det. (Pigtail)

* Alternate part #48K731313, 48K731314.
† Alternate part #48K722720.

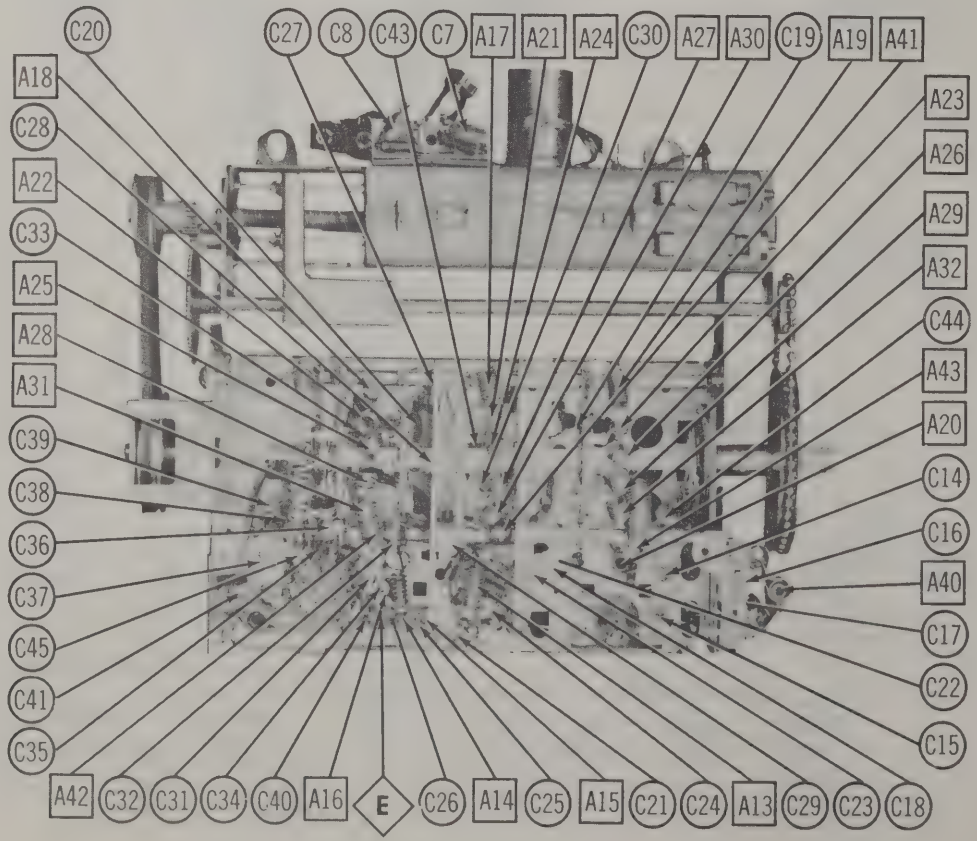
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M6	Dial Light	65X10867	#44 - Not used in some versions.
M7	Tuner	1U736211	VHF- TT-80 - Used in Ch. TS-534Y.
	Tuner	1U736206	VHF - TT-79, used in Ch. TS-534.
M8	Tuner	RTT-37	UHF - Used in Ch. TS-534Y.
M9	Video Det. Assy.	24K737340	Includes M5, coils, and capacitors
M10	Switch		Local-distance (DPDT-Slide type)
M11	Centering Device	48A721145	Includes deflection yoke (T5) rear cover
M12	Ion Trap	59K734028	
A4	Trimmer Cap.	20A736287	Video IF Input Trimmer (20-140MMF)
	Cabinet	16K737267	Models 21K37B, Y21K37B
	Cabinet	16K737450	Models 21K37BR, Y21K37BR
	Cabinet	16K736686	Models 21K39, Y21K39
	Cabinet	16K736687	Models 21K39B, Y21K39B
	Cabinet	16F736667	Models 21K40, Y21K40
	Cabinet	16K736668	Models 21K40B, Y21K40B
	Cabinet	16K737455	Models 21T26B, Y21T26B
	Cabinet	16K737456	Models 21T26BR, Y21T26BR
	Cabinet	16K737457	Models 21T26CH, Y21T26CH
	Cabinet	16K737133	Models 21T27B, Y21T27B
	Cabinet	16K737132	Models 21T27MA, Y21T27MA
	Cabinet	16K737451	Models 21T27PK, Y21T27PK
	Cabinet	16E736657	Models 21T28, Y21T28
	Cabinet	16K736658	Models 21T28B, Y21T28B
	Cabinet	16E736952	Models 24K9, Y24K9
	Cabinet	16K736953	Models 24K9B, Y24K9B
	Cabinet	16K737449	Models 24T3BR, Y24T3BR
	Knob	36B736235	Contrast - All models
	Knob	36K736677	Fine tuning - Models 21K37B, BA, BR, BRA, Y21K37B, BA, BRA, 21T26B, BR, Y21T26B, BR
	Knob	36K737373	Fine tuning - Models 21K39, B, 21K40, B, Y21K39, B, Y21K40, B, 21T27B, MA, PK, Y21T27B, MA, PK, 21T28, B, Y21T28, B, 24K9, B, Y24K9, B, 24T3BR, Y24T3BR
	Knob	36A736676	Fine tuning - Models 21T26CH, Y21T26CH
	Knob	36B736985	Horiz. Hold, Vert. Hold, Brightness - Models 21K37B, BA, BR, BRA, Y21K37B, BA, BR, BRA, 21T26B, BR, Y21T26B, BR
	Knob .	36A736249	Horiz. Hold, Vert. Hold, Brightness - Models 21K39, B, 21K40, B, Y21K39, B, Y21K40, B, 21T28, B, Y21T28, B, 24K9, B, Y24K9, B, 24T3BR, Y24T3BR, 21T27B, MA, PK, Y21T27B, MA, PK
	Knob	36K736986	Horiz. Hold, Vert. Hold, and Brightness - Models 21T26CH, Y21T26CH
	Knob	36B736987	On-off-volume - Models 21K37B, BA, BR, BRA, Y21K37B, BA, BR, BRA, 21T26B, BR, Y21T26B, BR
	Knob	36K736988	On-off-volume - Models 21T26CH, Y21T26CH
	Knob	36K737374	On-off-volume - Models 21K39, B, 21K40, B, Y21K39, B, Y21K40, B, 21T27B, MA, PK, Y21T27B, MA, PK, 21T28, B, Y21T28, B, 24K9, B, Y24K9B, 24T3BR, Y24T3BR
	Knob	36K736246	VHF Channel Selector - Models 21K37B, BR, 21T26B, BR
	Knob	36K736245	VHF Channel Selector - Models Y21K37B, BR, Y21T26B, BR
	Knob	36K736244	VHF Channel Selector - Models 21K39, B, 21K40, B, 21T27B, MA, PK, 21T28, B, 24K9, B, 24T3BR
	Knob	36C736243	VHF Channel Selector - Models Y21K39, B, Y21K40, B, Y21T27B, MA, PK, Y21T28, B, Y24K9, B, Y24T3BR
	Knob	36K736248	VHF Channel Selector - Model 21T26CH
	Knob	36K736247	VHF Channel Selector - Model Y21T26CH
	Scale	34C736236	UHF Dial - Models Y21K37B, BR, Y21K39, B, Y21K40, B, Y21T26B, BR, CH, Y21T27B, MA, PK, Y21T28, B, Y24K9, B, Y24T3BR
	Safety Glass	61K736858	Models 21K37B, BA, BR, BRA, Y21K37B, BA, BR, BRA, 21T26B, BA, BR, BRA, CH, CHA, Y21T26B, BA, BR, BRA, CH, CHA
	Safety Glass	61K736132	Models 21K39, B, 21K40, B, Y21K39, B, Y21K40, B 21T27B, MA, PK, Y21T27B, MA, PK, 21T28, B, Y21T28, B,
	Safety Glass	61K736133	Models 24K9, B, Y24K9, B, 24T3BR, Y24T3BR

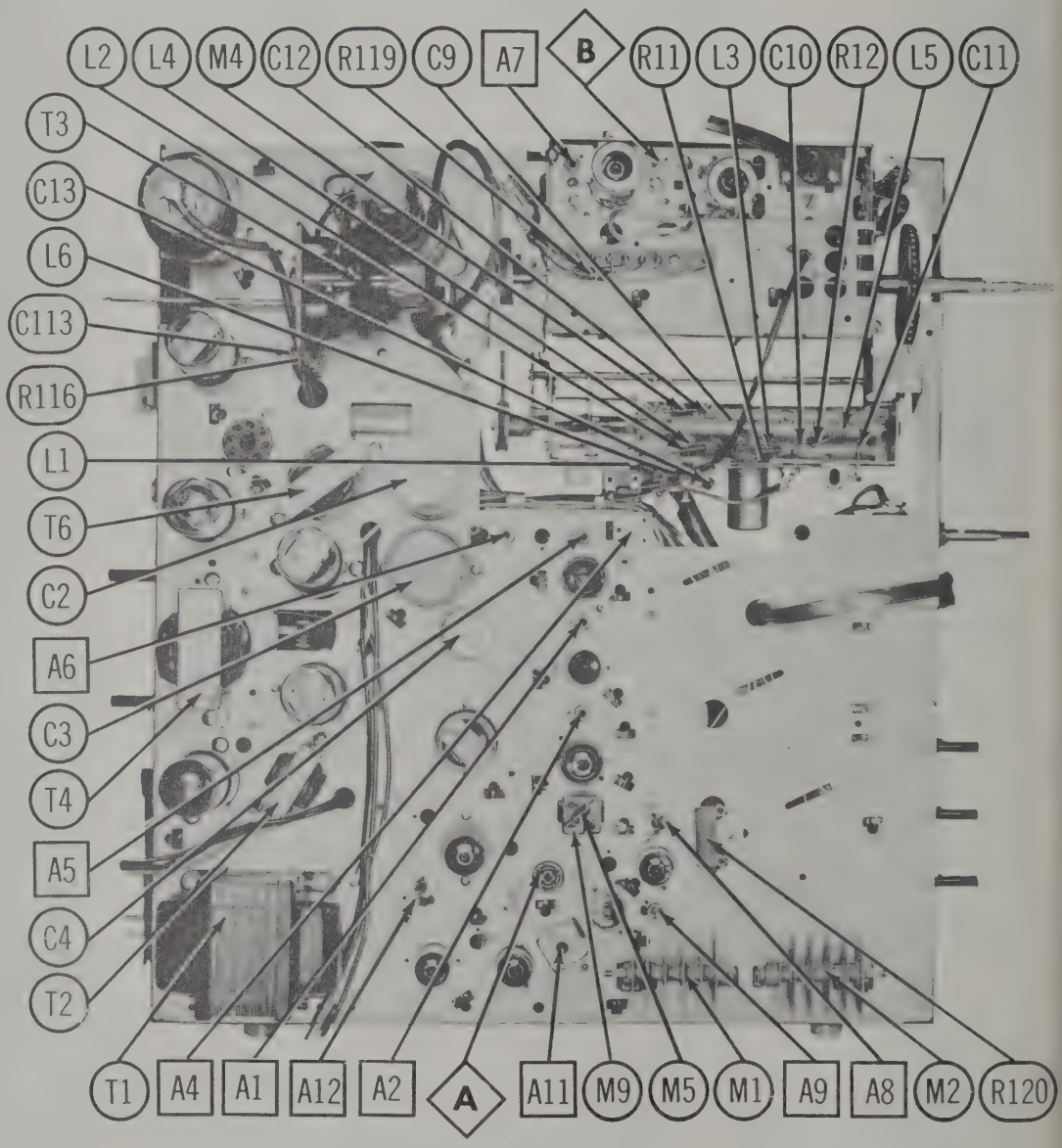
MOTOROLA MODELS Y21K37B, BA, BR, BRA, Y21K39, B, Y21K40, B, Y21T26B, BA, BR, BRA, CH, CHA, Y21T27B, MA, PK, Y21T28, B, 21K37B, BA, BR, BRA, 21K39, B, 21K40, B, 21T26B, BA, BR, BRA, CH, CHA, 21T27B, MA, PK, 21T28, B (Ch. TS-534, Y, YB)
ALTERNATE VIDEO IF AND AGC CIRCUIT SCHEMATIC
VIDEO IF AND AGC CIRCUIT USED IN CHASSIS TS-534C, AND TS-534D
VIDEO IF INPUT CIRCUIT USED WITH CHASSIS TS-534D
(VIDEO OUTPUT) TO JUNCT. OF R64, R62 & C69
VIDEO OUTPUT 12BY7
CONTRAST CONTROL 350Ω
(SOUND TAKE-OFF) TO C77
TO PIN 3 OF V14 (SYNC SEP)
TO 145V LINE
(SYNC TAKE-OFF) TO C93
3RD VIDEO IF 6CB6
2ND VIDEO IF 6BZ6
1ST VIDEO IF 6BZ6
ACC KEYING 6AU6
(BOOST VOLTAGE) TO JUNCT. OF TERM. 2 OF T2 & PIN 10 OF V20
TO TERM 3 OF T3 (HORIZ TRANSFORMER)
TO JUNCT. R109 & R110
(RF AGC) TO R22
(IF INPUT) TO L25
(1ST VIDEO IF) TO PIN 1 OF V4
TO JUNCT. OF R37 & C46
(MIXER) TO PIN 6 OF V3A
CHASSIS TS 534D-08-09
CHASSIS TS 534D-06-09
CHASSIS TS 534D
CHASSIS TS 534D-09
CATH
TP-1
TP-2
TP-3
TP-4
TP-7



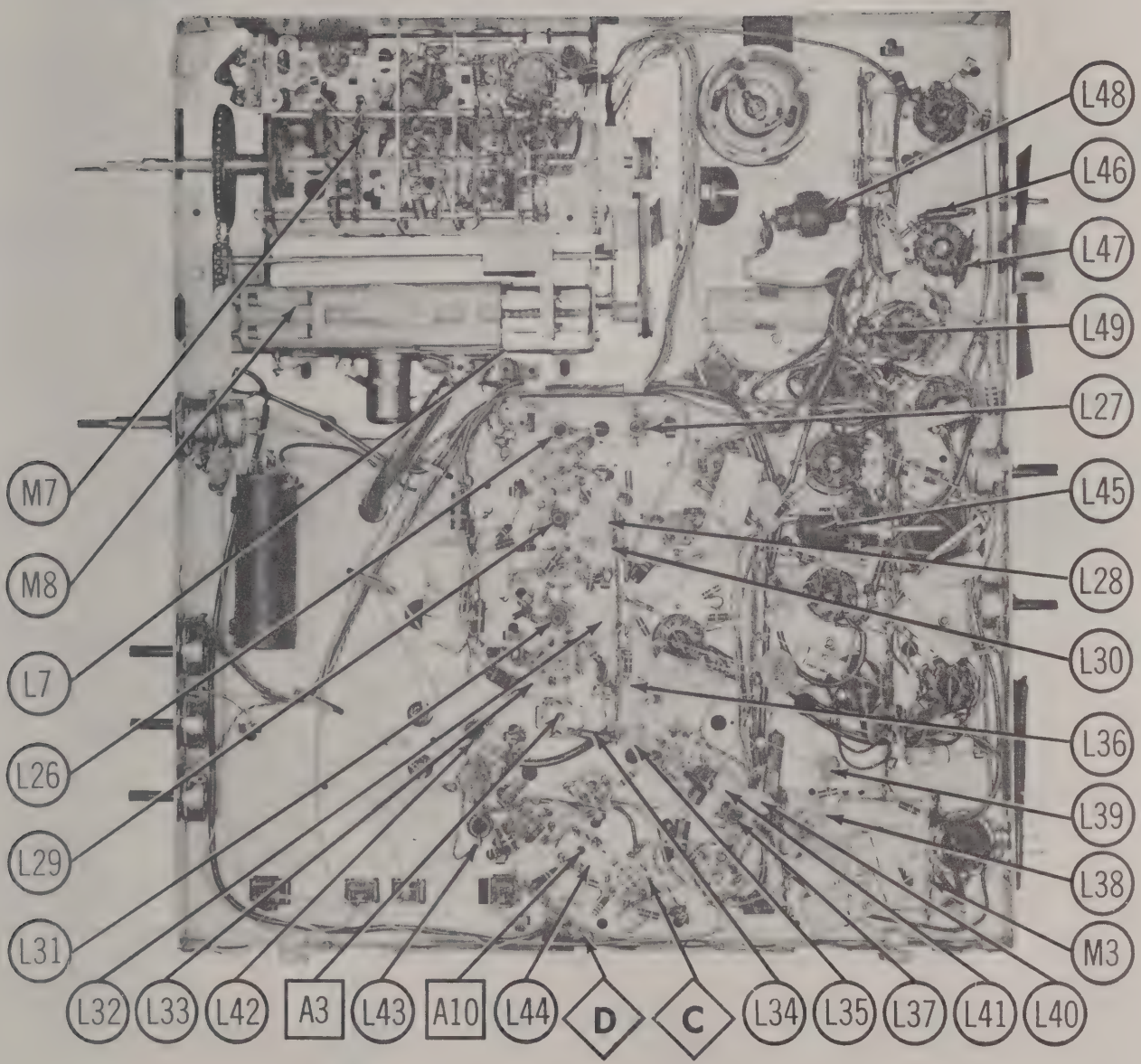
VHF-UHF TUNER BOTTOM VIEW



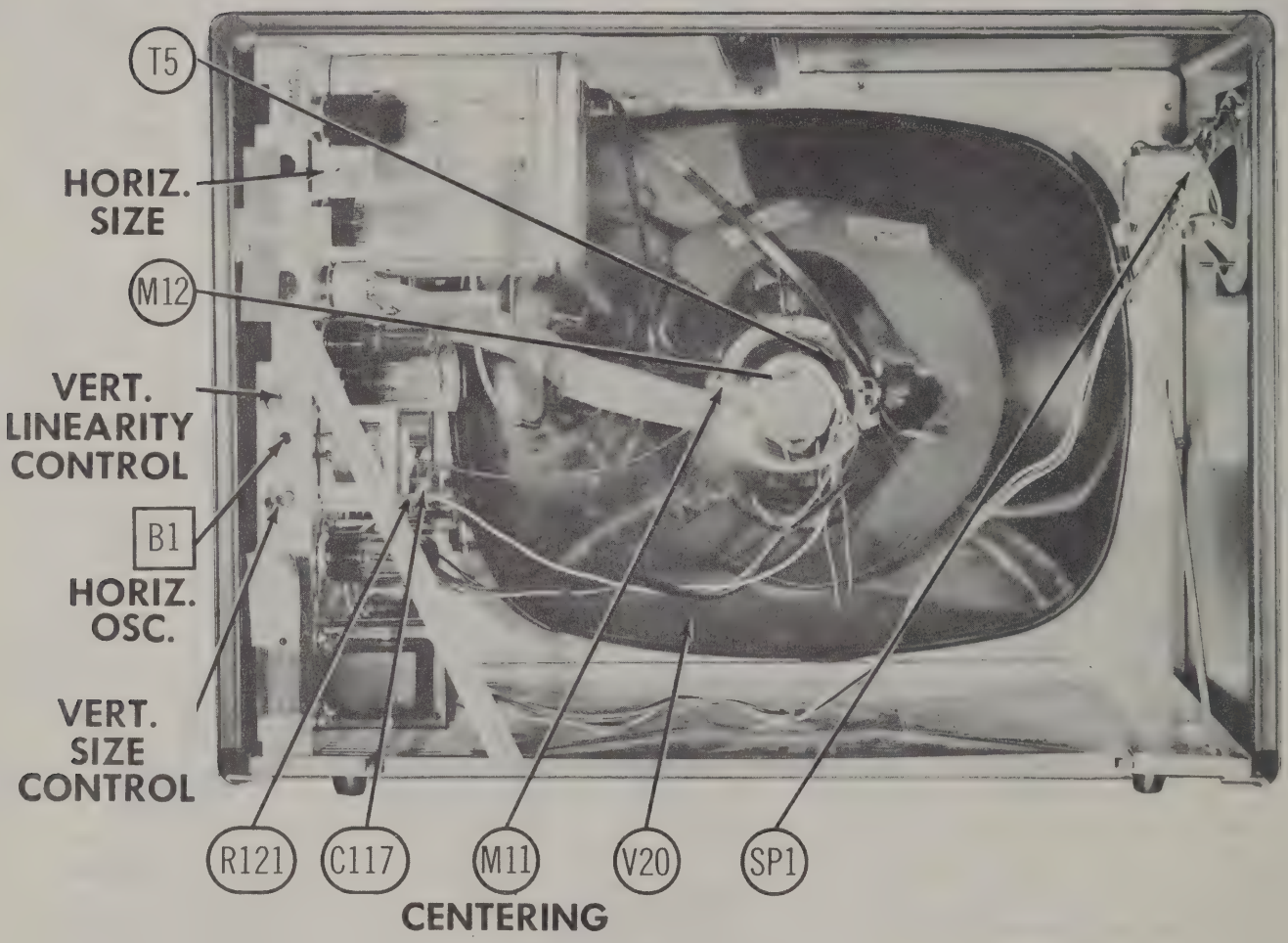
VHF-UHF TUNER BOTTOM VIEW



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., AND ALIGNMENT IDENTIFICATION



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern. Adjust the brightness and contrast controls for a normal picture.

1. Short out the AFC voltage and shunt the horizontal oscillator coil (L46) to ground (chassis) with a .1MFD, 400V capacitor. This may be done with the chassis in cabinet by using the three pin sockets on rear of chassis labeled "Test Receptacle".

2. Adjust the horizontal hold control to the point where picture remains stable horizontally.

3. Remove .1MFD capacitor from L46 and adjust the horizontal oscillator slug (B1) to the point where picture remains stable horizontally.

4. Remove short from AFC voltage and adjust the horizontal hold control until picture remains in sync over approximately 30 degrees of its range while switching off channel and back again.

Adjust the horizontal size control (located just above the left rear side of the chassis) for a picture slightly wider than necessary to fill the picture mask horizontally.

PACKARD-BELL MODELS 21SC1, U, 21ST1, U, 24ST1, U (Ch. 88S1, U)

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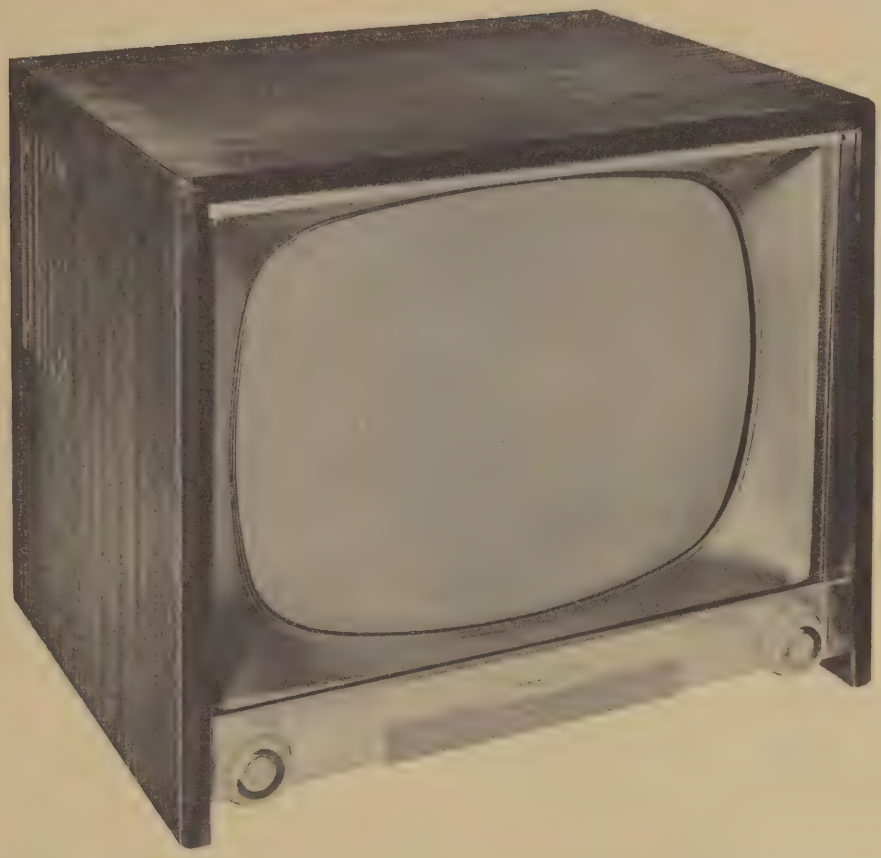
The contents for this envelope will be found among the last folders in this complete set of folders . . . unless it has been purchased as part of a complete volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



PACKARD-BELL MODEL 21ST1

TRADE NAME	Packard-Bell Models 21SC1, 21ST1, 24ST1 (Ch. 88S1), 21SC1-U, 21ST1-U, 24ST1-U (Ch. 88S1-U)
MANUFACTURER	Packard-Bell Co., - Service Division, 11th. & Hope Sts., Los Angeles 15, Calif.
TYPE SET	Television Receiver
TUBES	Eighteen
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.5 Amp. @ 117 Volts AC
TUNING RANGE-	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

INDEX

Alignment Instructions 6
Disassembly Instructions 1
Horizontal Sweep Circuit Adjustments 16
Parts List and Descriptions 12, 13, 14
Photographs
Cabinet-Rear View 16
Capacitor Identification 3, 10
Chassis-Top View 7
RF Tuner 15
Resistor Identification 4, 9
Photographs (Cont)
Trans., Inductor & Alignment Identification 7
Resistance Measurements 8
Servicing in the Field 1
Schematic (Alternate Tuner) 11
Schematic (TV) 2
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

PACKARD-BELL MODELS 21SC1, U, 21ST1, U, 24ST1, U (Ch. 88S1, U)

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3611 IRVING ST.
DENVER, COLO.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

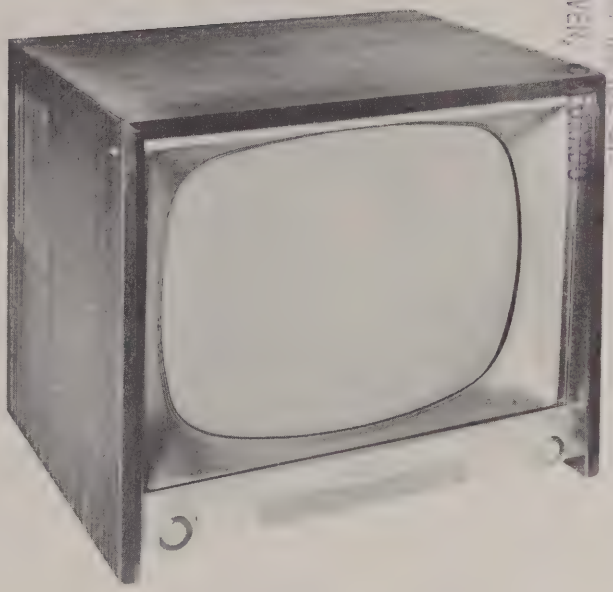
1. Remove 8 push-on type control knobs from front panel of cabinet.

2. Remove 7 wood screws and 1 metal screw. Remove rear cover.

3. Disconnect speaker plug.

4. Remove 3 chassis bolts. Remove chassis.

5. Remove 4 wood screws. Remove speaker.



MODELS	CHASSIS
21SC1, 21ST1, 24ST1	88S1
21S1-U, 21ST1-U, 24ST1-U	88S1-U

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet above and slightly to the left of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 3 wood screws holding metal strip at the top edge of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

SPECIAL ADJUSTMENTS - Picture Lock Adjustment

The picture lock control should be adjusted at the location where the receiver is to be used.
Tune in a local TV station.
Turn picture lock control clockwise until sync remains stable.

NOTE: If noise tends to distort sync, control should be set as far clockwise as possible without pulling picture.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjust horizontal hold control until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L17) located on top of chassis.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

PACKARD-BELL MODELS 21SC1, U, 21ST1, U, 24ST1, U (Ch. 88S1, U)

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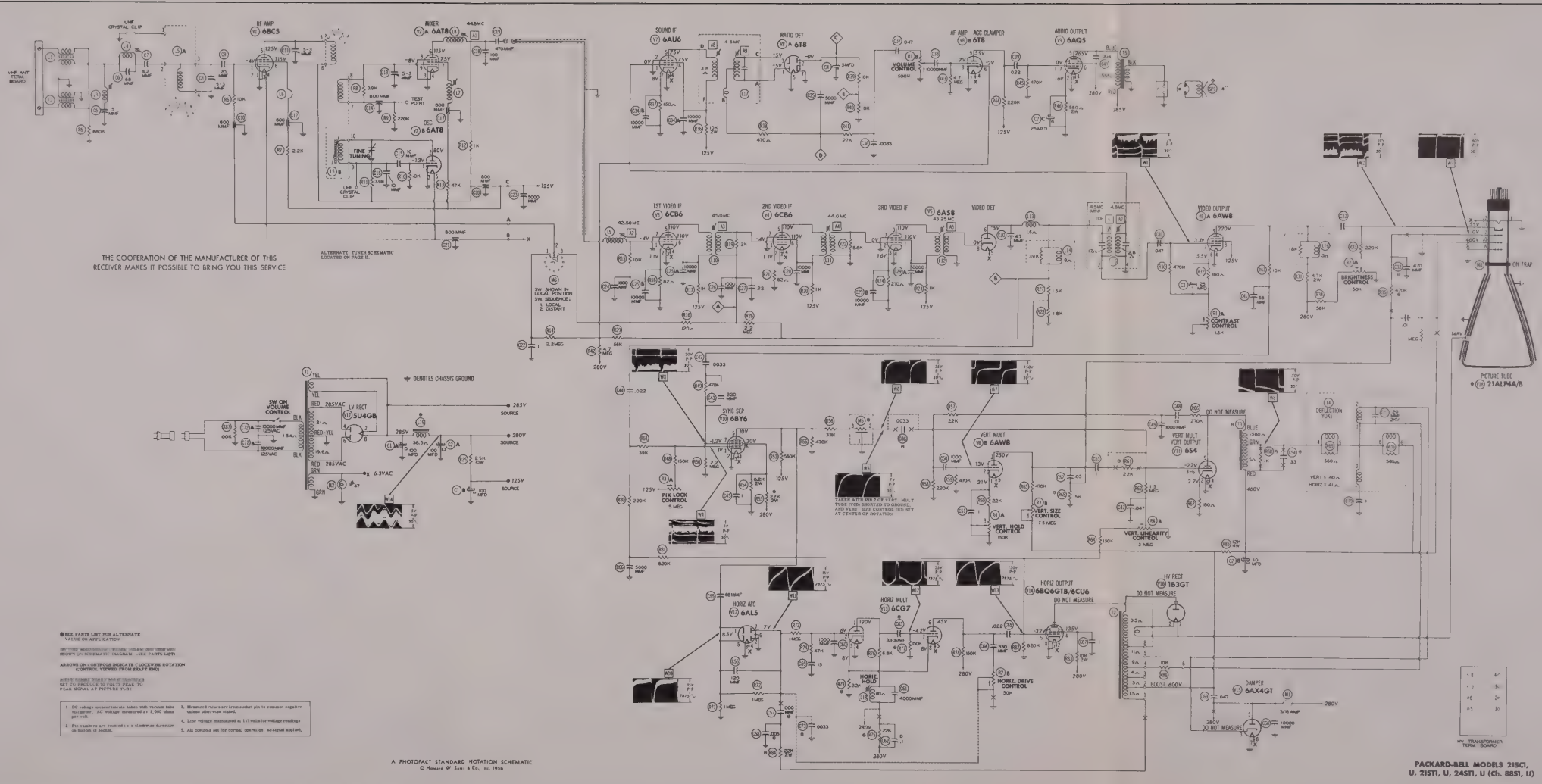
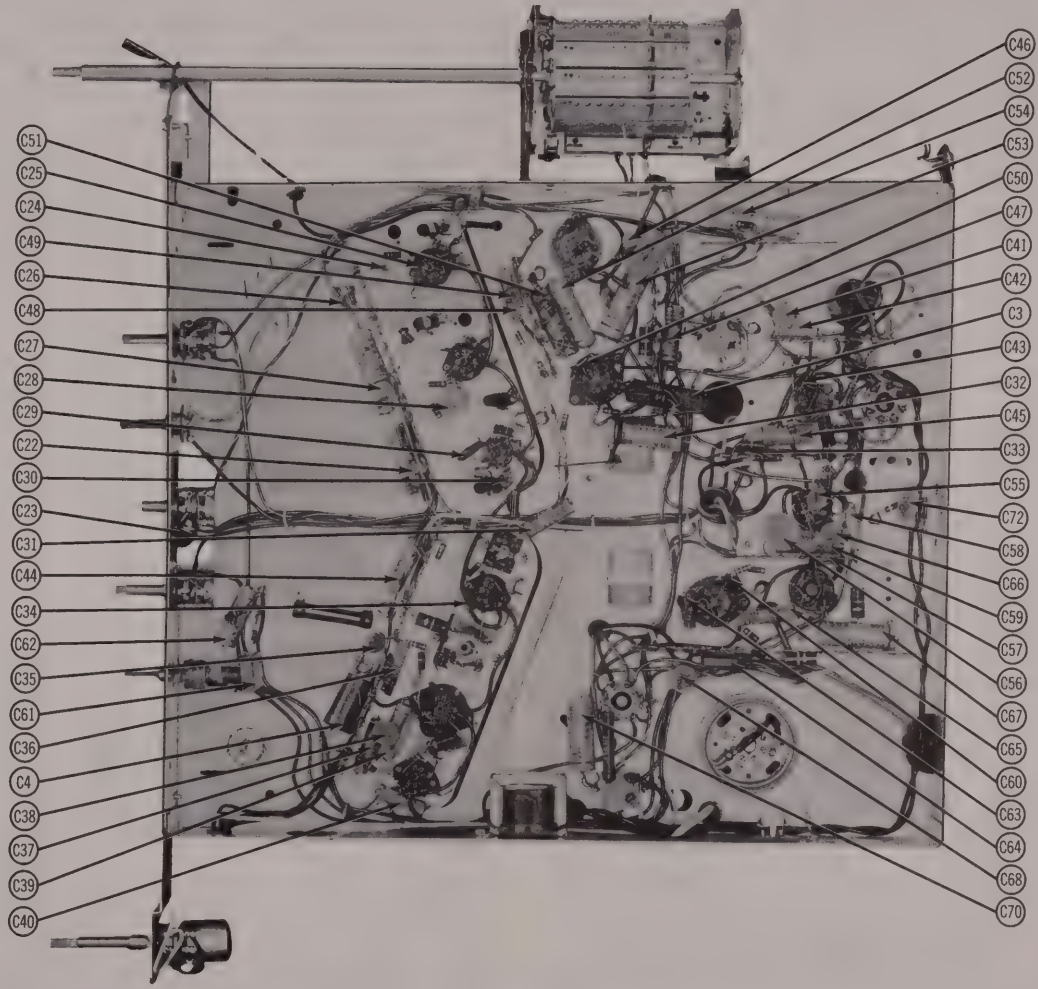
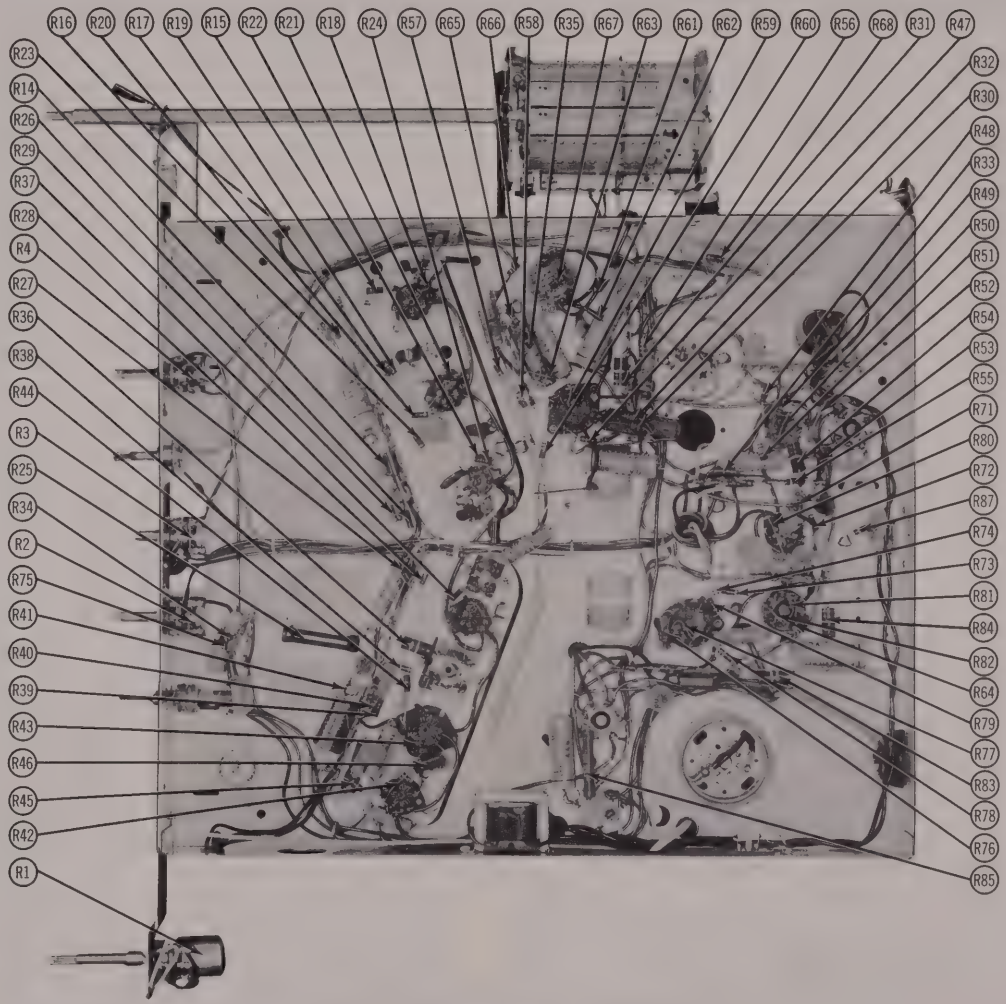

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
ALTERNATE TUNER SCHEMATIC LOCATED ON PAGE 11.
DENOTES CHASSIS GROUND
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction as bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation, no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1958
PACKARD-BELL MODELS 21SC1, U, 21ST1, U, 24ST1, U (Ch. 88S1, U)

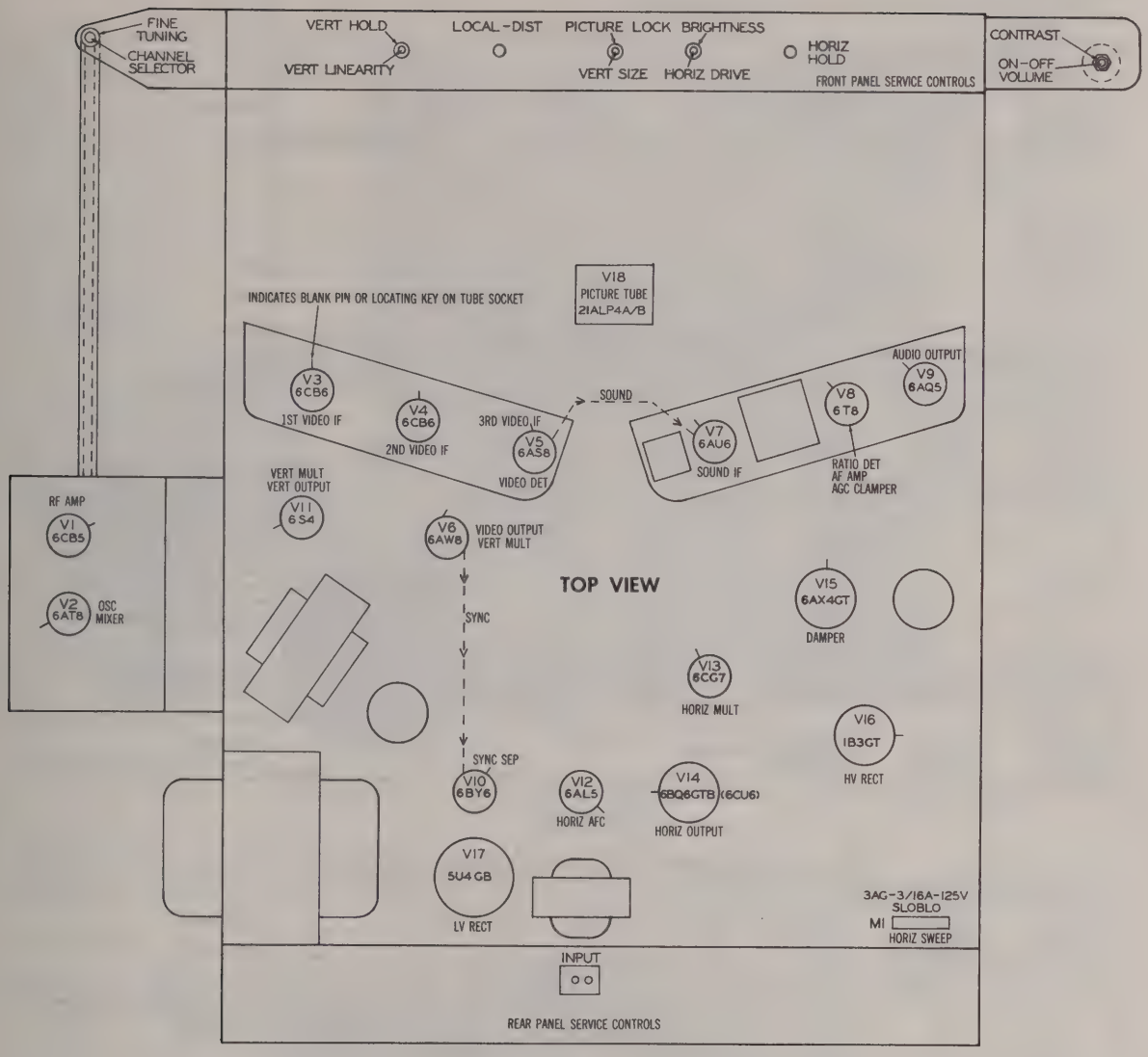


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V17**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V18**
Has pic, no sound - **V7, V8, V9**
Overloaded picture - **V8**

SYNC FAILURE
No vert. sync - **V6, V10, V11**
No horiz. sync - **V10, V12, V13**
No vert. or horiz. sync - **V10**

SWEEP FAILURE
No raster, has sound - **V13, V14, V15, V16, V18, Fuse (MI)**
No vertical deflection - **V6, V11**
Poor vert. linearity or foldover - **V6, V11**
Poor horiz. linearity or foldover - **V13, V14, V15**
Narrow picture - **V13, V14, V15, V16, V17**
Vert. off freq. - **V6, V10, V11**
Horiz. off freq. - **V10, V12, V13**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped away from the chassis. Do not remove the horizontal oscillator tube (V13) from its socket to disable the high voltage.
Allow 10 minutes warm-up period for receiver and test equipment.

VIDEO IF ALIGNMENT

Do not connect a negative voltage to the AGC line.
Set generator output at maximum.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.001MFD	High side to ungrounded tube shield floating over osc-mixer tube (V2). Low side to chassis.	44.8MC	Any non-interfering channel	DC probe to point Ⓐ. Common to chassis.	A1	Adjust for maximum output.
2.	"	"	42.50MC	"	"	A2	"
3.	"	"	45.0MC	"	"	A3	"
4.	"	"	44.0MC	"	"	A4	"
5.	"	"	43.25MC	"	"	A5	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the negative lead of a 5MFD, 50 volt capacitor to the ungrounded side of C27. Connect positive lead to chassis.
Couple a second signal generator to an ungrounded tube shield floating over converter tube (V2) to provide marker on response curve.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	63MC (10MC Swp.)	41.25 MC 42.25 MC 45.0 MC 45.75 MC	3	Vert. Amp. thru 22KΩ to point Ⓑ. Low side to chassis.		Check for response similar to Fig. 1. Adjust A2 for the overall band width. Adjust A1 to place the 45.75MC marker at 50% on the response curve. Adjust A3 for the position of 45.0MC marker on response curve. Adjust A4 to place 41.25MC marker in position and to correct bottom portion of response curve. A5 controls position of curve on low frequency side. Note position of 45.0MC marker on response curve. It should not exceed this position.

4.5MC TRAP ALIGNMENT

If a 4.5MC signal generator of crystal accuracy, capable of at least one volt output is not available, tune in a TV station and adjust A6 for MINIMUM 4.5MC beat interference in the picture. Adjust contrast control fully clockwise. Remove the third video IF tube (V5) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.001MFD	High side to point Ⓑ. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru detector (Fig. 2) to pin 11 (cathode) of picture tube. Common to chassis.	A6	Adjust for MINIMUM deflection with signal generator output at least 1 volt.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove the third video IF tube (V5) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.001MFD	High side to point Ⓑ. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point Ⓒ. Common to chassis.	A7, A8	Adjust for maximum deflection.
9.	"	"	"	"	DC probe to point Ⓓ. Common to point Ⓔ.	A9	Adjust for zero reading. A positive and a negative reading will be obtained on either side of the correct setting. Replace V5 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Remove the third video IF tube (V5) from its socket.
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.001MFD	High side to point Ⓑ. Low side to chassis.	4.5MC (450KC Swp.)	4.5MC	Any	Vert. Amp. to point Ⓒ. Low side to chassis.	A7, A8	Disconnect stabilizing capacitor (C4). Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
9	"	"	"	"	"	Vert. Amp. to point Ⓓ. Low side to chassis.	A9	Reconnect C4. Adjust A9 so that 4.5MC occurs at center of response curve as in Fig. 4. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines. Replace V5 in its socket.

TUNER ALIGNMENT

The tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

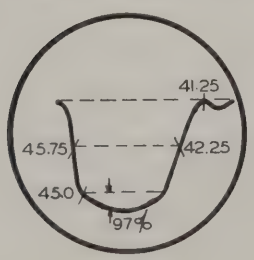


FIG. 1

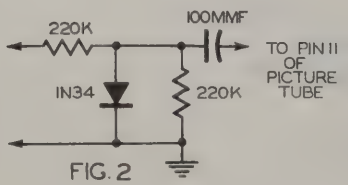


FIG. 2

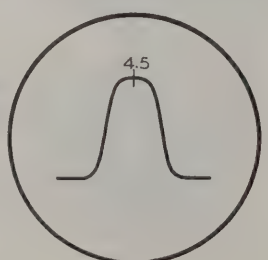


FIG. 3

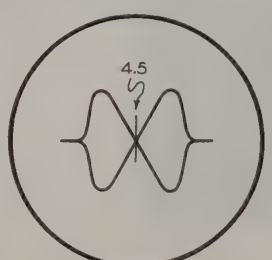
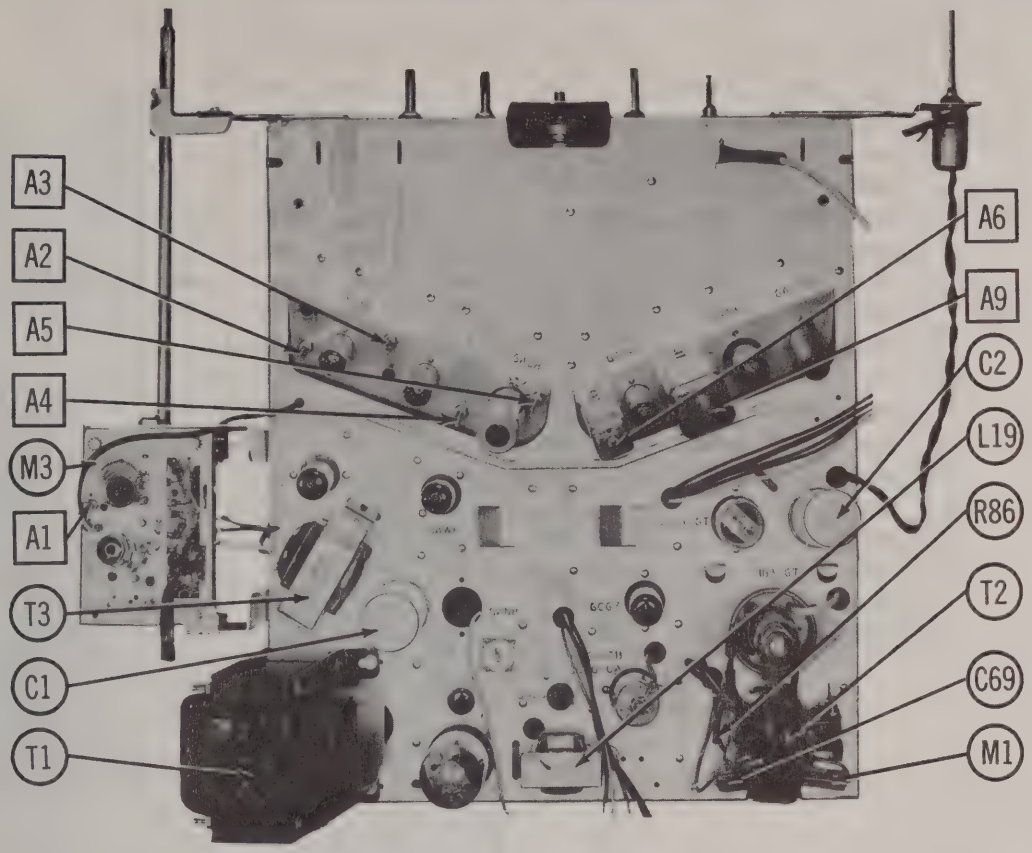
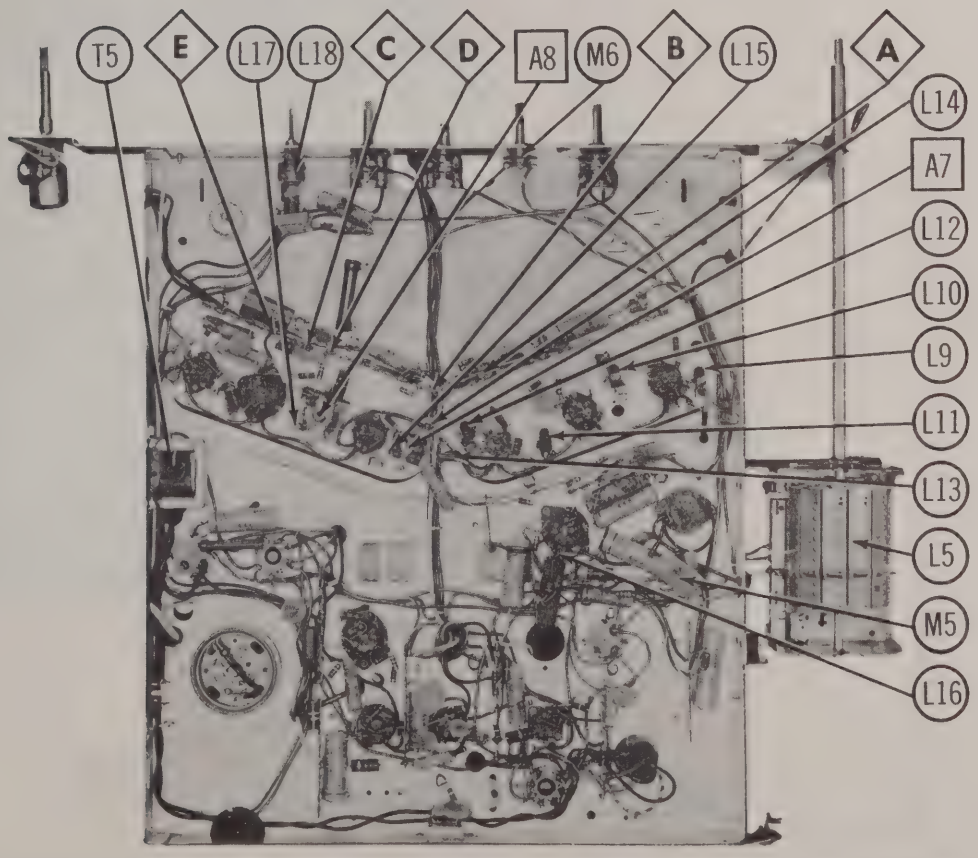


FIG. 4



CHASSIS TOP VIEW

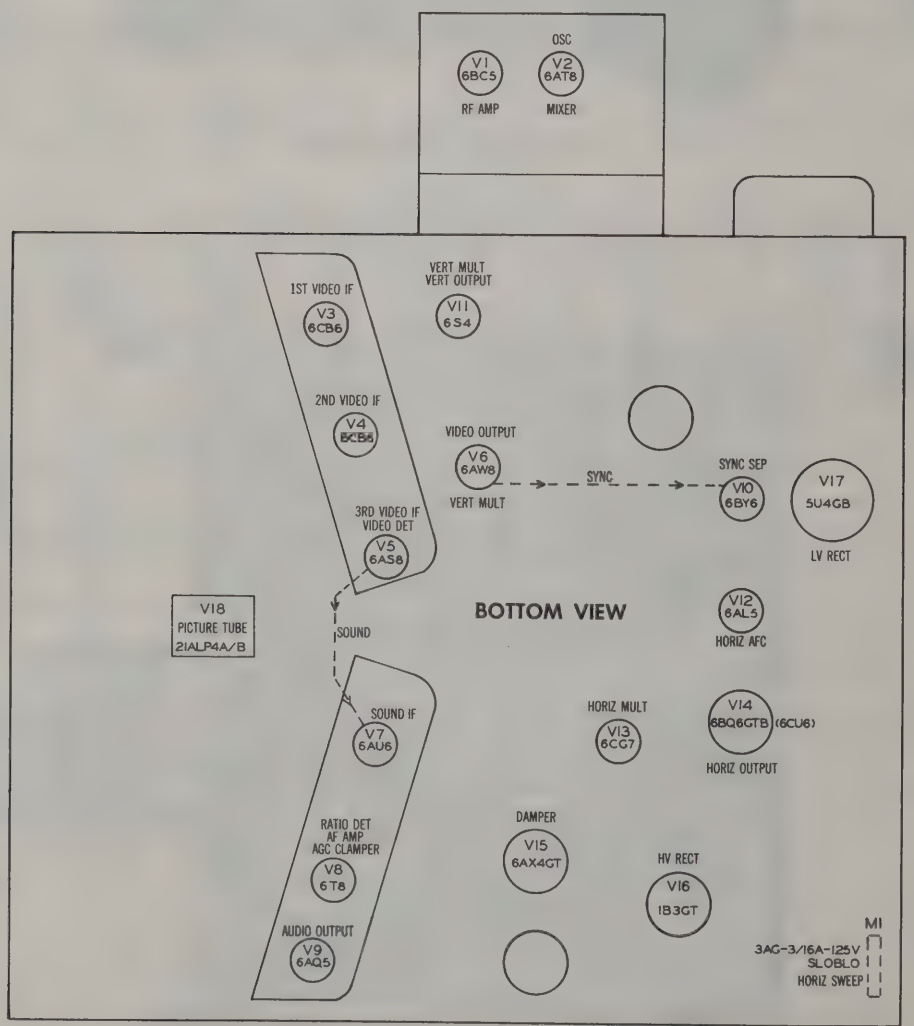


CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

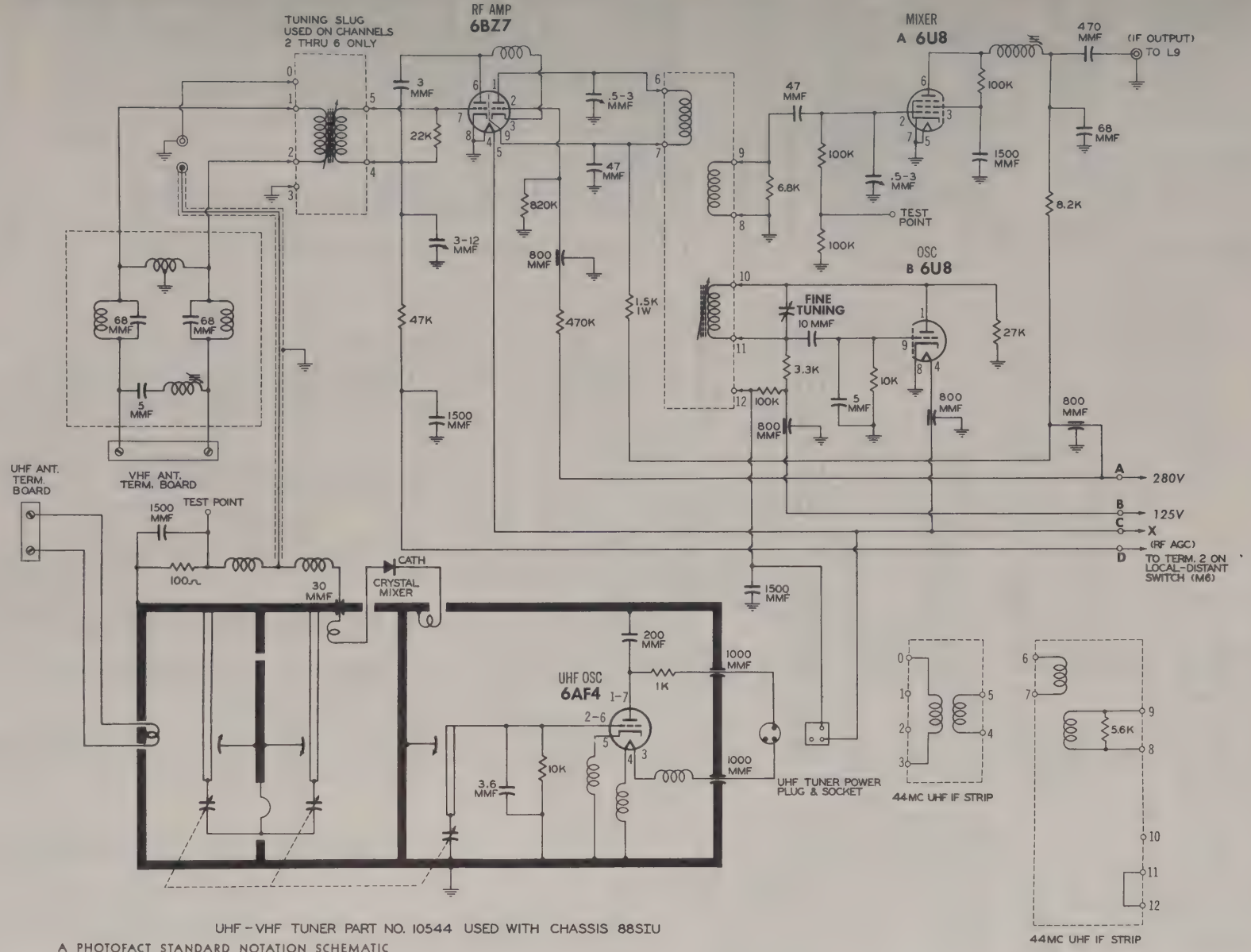
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	2. 2Meg	0Ω	0Ω	. 1Ω	† 2. 5KΩ	† 5KΩ	0Ω		
V 2	6AT8	10KΩ	† 6. 5KΩ	0Ω	0Ω	. 1Ω	† 3. 5KΩ	† 50KΩ	0Ω	220KΩ
V 3	6CB6	2. 2Meg	82Ω	0Ω	. 1Ω	† 3. 5KΩ	† 3. 5KΩ	0Ω		
V 4	6CB6	2. 2Meg	82Ω	0Ω	. 1Ω	† 3. 5KΩ	† 3. 5KΩ	0Ω		
V 5	6AS8	† 3. 5KΩ	. 1Ω	270Ω	0Ω	. 1Ω	3. 3KΩ	0Ω	. 1Ω	† 3. 5KΩ
V 6	6AW8	80KΩ	470KΩ	▲ L 6Meg	0Ω	. 1Ω	250Ω	500KΩ	† 2. 5KΩ	† 4. 7KΩ
V 7	6AU6	2. 8Ω	0Ω	0Ω	. 1Ω	† 13KΩ	† 13KΩ	150Ω		
V 8	6T8	INF	20KΩ	INF	. 1Ω	0Ω	50KΩ	0Ω	4. 7Meg	† 220KΩ
V 9	6AQ5	470KΩ	560Ω	0Ω	. 1Ω	† 555Ω	† 39Ω	470KΩ		
V 10	6BY6	350KΩ	0Ω	0Ω	. 1Ω	† 280KΩ	† 17KΩ	2. 2Meg		
V 11	6S4	NC	180Ω	2. 2Meg	. 1Ω	0Ω	2. 2Meg	NC	NC	▲ 13KΩ
V 12	6AL5	1Meg	0Ω	0Ω	. 1Ω	1Meg	0Ω	2Meg		
V 13	6CG7	† 30KΩ	3Meg	2. 2KΩ	0Ω	. 1Ω	† 150KΩ	150KΩ	2. 2KΩ	0Ω
V 14	6BQ6GTB/ 6CU6	NC	. 1Ω	TP	† 10KΩ	500KΩ	NC	0Ω	0Ω	TOP CAP ▲ 1Ω
V 15	6AX4GT	TP	TP	200KΩ	NC	† 39Ω	TP	0Ω	. 1Ω	
V 16	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 326Ω
V 17	5U4GB	NC	20KΩ	NC	21Ω	NC	20Ω	NC	20KΩ	
V 18	21ALP4A/B	0Ω	500KΩ	Pin 6 ▲ 12KΩ	PIN 10 ▲ 12KΩ	PIN 11 † 200KΩ	PIN 12 . 1Ω			

† MEASURED FROM PIN 2 OF V17.
▲ MEASURED FROM PIN 3 OF V15.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART



UHF - VHF TUNER PART NO. 10544 USED WITH CHASSIS 88SIU

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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UHF-VHF TUNER SCHEMATIC

PACKARD-BELL MODELS 21SC1, U, 21ST1, U, 24ST1, U (Ch. 88S1, U)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BC8	6BC8	
V2	Mixer - Osc.	6A78	6A78	
V3	1st. Video IF Amplifier	6CB6	6CB6	
V4	2nd. Video IF Amplifier	6CB6	6CB6	
V5	3rd. Video IF Amplifier-Video Detector	6AS8	6AS8	
V6	Video Output-Vert. Mult.	6AV8	6AV8	
V7	Sound IF Amplifier	6AU8	6AU8	
V8	Ratio Detector-AF Amplifier-AGC Clamper	6T8	6T8	
V9	Audio Output	6AQ8	6AQ8	
V10	Sync Separator	6BY6	6BY6	
V11	Vert. Mult.-Vert. Output	6B4	6B4	
V12	Horiz. AFC	6AL5	6AL5	
V13	Horiz. Mult.	6CQ7	6CQ7	
V14	Horiz. Output	6BQ6GTB/6CU6	6BQ6GTB/6CU6	
V15	Damper	6AX4GT	6AX4GT	
V16	HV Rectifier	1B3GT	1B3GT	
V17	LV Rectifier	5U4GB	5U4GB	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: Packard-Bell PART No	REPLACEMENT DATA: PART No	REPLACEMENT DATA: GENERAL ELECTRIC PART No	REPLACEMENT DATA: SYLVANIA PART No	NOTES
V18	21ALP4A/B ①		21ALP4A/B ①	21ALP4A/B ①	① Aluminized ② Silver screen "85"
		21ALP4A ①	21ALP4A ①	21ALP4A ①	
		21ALP4B ①			
		21ALP4	21ALP4	21ALP4	
	24DP4	24DP4A ①	24DP4A ①	24DP4A ②	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: PYRAMID PART No.	REPLACEMENT DATA: SANGAMO PART No.	REPLACEMENT DATA: SPRAGUE PART No.
C1A	▲100	350	34081		BG3	FP332.4	TM-3030	Q-012	TVL-3535
B	▲100	350			BBRD2345			MTD-3520	TVA-2730
C2A	▲100	350	34093			FP330.6	TM-3143	Q-670	
B	▲10	475				TC26			
C	▲25	25							
C3	25	25	24008A	PR325V25	BR252	TC26	TD-25-M	FM-0225	TVA-1205
C4	5	50	24038	PR515V4	BR550	TC30	TD-5-50	MMT-0505	TVA-1303

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: SPRAGUE PART No.	NOTES
C5	5			NPO-D15	TCZ-4R7	Z01	NPOA-050	Z7-555	5TCCB-V47	
C6	68			N750-D168	TCN-68	N038	N750L-680		5TCU-Q68	
C7	5.3			NPO-D05.3		Z08	NPOA-SB5			
C8	.5-3				SS9-3		3135-01-0R5	CT565A		
C9	130			BPD-00013	BD-121	G044	81L-131	UC-5313	5GA-T13	
C10	500				SS9-3		3135-01-0R5	CT565A		
C11	.5-3									
C12	500				SS9-3		3135-01-0R5	CT565A		
C13	.5-3									
C14	500									
C15	10									
C16	10									
C17	500									
C18	100			N750-D100	TCN-100	N043	N750L-101	NT-531	5TCU-71	
C19	470			BPD-00047	DD-471	K080	831-471	UC-5347	5GA-T47	
C20	300									
C21	500									
C22	.1	300	23107	P383N-1	DF-104	CUB2P1	NPOA-050	PT401	3TM-P1	
C23	5000		23921	BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C24	1000		23965	SD1000	DD-102	TP53	81L-102	UC-531	5GA-D1	
C25A	10000		23963	BPD-0X01	DD-103	DX053	81L-01	DC-511	5HK-X81	
B	10000						81L-01	DC-511		
C26	1000		23965	SD1000	DD-102	TP52	81L-102	UC-531	5GA-D1	
C27	.22	300	23109	P383N-22		CUB2P22	DF-104	PT4022	3TM-P22	
C28	10000		23929	BPD-01	DD-103	K062	81L-01	DC-511	5HK-81	
C29A	10000		23963	BPD-0X01	DD-103	DX053	81L-01	DC-511	5HK-X81	
B	10000						81L-01	DC-511		
C30	4.7		23978	NP0-S14.7	TCZ-4R7	TZ07	NPOA-4R7	Z7-5547	5TCCB-V47	
C31	.047	300	23105	BPD-05	DF-503	CUBS847		PT4147	3TM-S47	
C32	.1	600	23145	P683N-1	DF-104	CUB6P1		PT601	6TM-P1	
C33	470		23963	BPD-00047	DD-471	K080	831-471	UC-5347	5GA-T47	Note 1
C34A	10000		23963	BPD-2X01	DD8-103	DX082	811-01	DC-511	5HK-X81	
B	10000						811-01	DC-511		
C35	5000		23931	BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C36	.0033	400	23127	SI3300	DE-332	CUBE333	GP3-333-332	PT3332	6TM-D33	
C37	.047	300	23105	BPD-05	DF-503	CUBS847		PT4147	3TM-S47	
C38	10000		23939	BPD-01	DD-103	K063	811-01	DC-511	5HK-81	
C39	.022	600	23141	BPD-03	DD-303	CUB6S22	817-03		6TM-S22	
C40	.0047	600	23127	SI4700	DE-472	CUBE47	GP3-333-472	PT3247	6TM-D47	
C41	56		23923	NP0-S156	TCZ-56	Z038	NP0-337-560		5TCC-Q56	
C42	.0033	400	23127	SI3300	DE-332	CUBE333	GP3-333-332	PT3233	6TM-D33	
C43	220		23915	BPD-00022	DD-221	G051	811-221	UC-5323	5GA-T33	
C44	.022	400	23128	BPD-03	DD-303	CUB4S22	817-03	PT4122	4TM-S22	
C45	.1	300	23107	P383N-1	DF-104	CUBSP1		PT401	3TM-P1	
C46	.0033	400	23053	1464-0033		1R5D33			M5-333	Note 1
C47	.047	300	23105	BPD-05	DF-503	CUBS847		PT4147	3TM-S47	
C48	.01	600	23139	BPD-01	DD-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C49	1000		23965	SI1000	DD-102	TP53	811-102	UC-531	5GA-D1	
C50	1000		23965	SI1000	DD-102	TP53	811-102	UC-531	5GA-D1	
C51	.1	300	23107	P383N-1	DF-104	CUBSP1		PT401	3TM-P1	
C52	.05	600	23051							
C53	.1	600	23145	P683N-1	DF-104	CUB6P1		PT601	6TM-P1	
C54	.33	300		P383N-33						Note 3
C55	68		23923	NP0-D168	TCZ-68	Z038	NP0-337-680		5TCC-Q68	
C56	130		23903	NP0-D130	TCZ-130	TZ32	NP0-333-131		5TCC-T13	
C57	1000		23965	SI1000	DD-102	TP52	811-102	UC-531	5GA-D1	Note 1
C58	.005	600	23050	1464-005		1R5D5		MC3465	M5-35	Note 1
C59	.15	200	23108	P268N-15		CUBSP15		PT4015	2TM-P15	
C60	1000		23965	SI1000	DD-102	TP53	811-102	UC-531	5GA-D1	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No	REPLACEMENT DATA: MALLORY PART No	REPLACEMENT DATA: SPRAGUE PART No	NOTES
C61	4000	500	23208	1464-004		1R5D4		MC3463	M5-24	
C62	.1	300	23107	P383N-1	DF-104	CUBSP1		PT401	3TM-P1	Note 1
C63	330	500	23221	1469-00033	D8-331	5R5T33	811-331		M9-333	Note 3
C64	330	500	23221	1469-00033	D8-331	5R5T33	811-331		M9-333	
C65	.022	600	23141	BPD-03	DD-303	CUB6S22	817-02	PT6122	6TM-S22	
C66	5000		23931	BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C67	.1	600	23145	P683N-1	DF-104	CUB6P1		PT601	6TM-P1	
C68	10000		23939	BPD-01	DD-103	K063	811-01	DC-511	5HK-81	
C69	.047	600	23143	BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C70	.1	500	23145	P683N-1	DF-104	CUB6P1		PT601	6TM-P1	
C71	130	2000	23975							
C72A	10000	125VAC	23982A				DD-1032			
B	10000	125VAC					DD-1032			
C73	.0033	400		SI3300	DE-332	CUBE333	GP3-333-332	PT3233	6TM-D33	Note 4

Note 1. Not used in late production versions.
Note 2. Not used in some versions.
Note 3. Late production versions use 470MMF in this application.
Note 4. Not used in early production versions.

CONTROLS

ITEM No.	RATING: RESIST-ANCE	RATING: WATTS	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: MALLORY PART No.	INSTALLATION NOTES
R1A	1500Ω	½	25827	F1-7	RTV-316	* QJ-883	UF152R†	Contrast (Panel)
B	500KΩ	½		R2-41			UR54A ††	Volume (Rear)
C	Switch			KS-1			UR-56 †	Attach to R1B
R2A	50KΩ	½	25884	F1-29		** QJ-882	UF54L ††	Brightness (Panel)
B	50KΩ	½		R2-39			UR54L †	Horizontal Drive (Rear)
R3A	5Meg	½	25883			* QJ-880	UR3300	Pix Lock (Panel)
B	7.5Meg	½						Vertical Size (Rear)
R4A	150KΩ	½	25882	F1-32		** QJ-879	UR1251	Vertical Hold (Panel)
B	3Meg	½		R2-78				Vertical Linearity (Rear)

† Universal Replacement (Mallory Exact Duplicate Part No. UE1765).
†† Universal Replacement (Mallory Exact Duplicate Part No. UE97).
* Concentrikit Equivalent, K-4 Kit, Base Elements & Shafts, Bi7-109, P1-126 (Panel)
Bi8-133, R17-318 (Rear)
76-1 Switch
** Concentrikit Equivalent, K-3 Kit, Base Elements & Shafts, Bi1-123, P8-112 (Panel)
Bi1-123, R15-038(Rear)
• Concentrikit Equivalent, K-5 Kit, Base Elements & Shafts, Bi1-141, P11-024 (Panel)
Bi1-142, R16-017 (Rear)
•• Concentrikit Equivalent, K-2 Kit, Base Elements & Shafts, Bi1-129, P9-112 (Panel)
Bi8-140, R15-038 (Rear)

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R5	680KΩ	½		BTS-10K	
R6	10KΩ	½			
R7	2200Ω	½			
R8	39000Ω	½			
R9	220KΩ	½			
R10	10KΩ	½			
R11	3000Ω	½			
R12	1000Ω	½		BTS-1000	
R13	47KΩ	½			
R14	2.2Meg	½	73165	BTS-2.2Meg	
R15	10KΩ	½	73037		
R16	120Ω	½	73014	BTS-120	
R17	1000Ω	½	73025	BTS-1000	
R18	82Ω	½	73013	BTS-82	
R19	12KΩ	½	73038		
R20	1000Ω	½	73025	BTS-1000	
R21	82Ω	½	73013	BTS-82	
R22	680Ω	½	73035	BTS-680	
R23	1000Ω	½	73025	BTS-1000	
R24	270Ω	½	73018	BTS-270	
R25	2500Ω	10	73037	1 QAA-2500	
R26	2.2Meg	½	73165	BTS-2.2Meg	
R27	1500Ω	½	73027	BTS-1500	
R28	1000Ω	½	73025	BTS-1000	
R29	56KΩ	½	73046	BTS-56K	
R30	470KΩ	½	73157	BTS-470K	
R31	47KΩ	½	73043	BTS-47K	
R32	180Ω	½	73016	BTS-180	
R33	220KΩ	½	73153	BTS-220K	
R34	56KΩ	½	73046	BTS-56K	
R35	470KΩ	½	73157	BTS-470K	Note 4
R36	10KΩ	½	73037	BTS-10K	
R37	150Ω	½	73015	BTS-150	
R38	470Ω	½	73031	BTS-470	
R39	10KΩ	½	73037	BTS-10K	
R40	10KΩ	½	73037	BTS-10K	
R41	270Ω	½	73043	BTS-47K	
R42	4.7Meg	½	73189	BTS-4.7Meg	
R43	4.7Meg	½	73189	BTS-4.7Meg	Note 5
R44	330KΩ	½	73183	BTS-330K	
R45	470KΩ	½	73157	BTS-470K	
R46	560Ω	2	73423	BTS-560	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R47	10KΩ	½	73037	BTS-10K	
R48	100KΩ	½	73151	BTS-100K	
R49	470KΩ	½	73157	BTS-470K	
R50	2.2Meg	½	73165	BTS-2.2Meg	
R51	39KΩ	½	73044	BTS-39K	
R52	560KΩ	½	73058	BTS-560K	
R53	22KΩ	½	73041	BTS-22K	
R54	8200Ω	3	73438	BTS-8200	
R55	470KΩ	½	73157	BTS-470K	
R56	33KΩ	½	73043	BTS-33K	
R57	22KΩ	½	73041	BTS-22K	
R58	220KΩ	½	73053	BTS-220K	
R59	470KΩ	½	73157	BTS-470K	
R60	22KΩ	½	73041	BTS-22K	
R61	22KΩ	½	73041	BTS-22K	Note 3
R62	1.5Meg	½	73182	BTS-1.5Meg	
R63	470KΩ	½	73157	BTS-470K	
R64	150KΩ	½	73151	BTS-150K	
R65	15KΩ 5%	½	73089-1	BTS-15K	Note 3
R66	270KΩ	½	73054	BTS-270K	
R67	180Ω	½	73016	BTS-180	
R68	1000Ω	½	73025	BTS-1000	Note 4
R69	56Ω	½	73022		
R70	56Ω	½	73022		
R71	1Meg	½	73061		
R72	1Meg	½	73061		
R73	1Meg	½	73061		
R74	47KΩ	½	73045		Note 5
R75	22KΩ	½	73041		
R76	5600Ω	½	73037		
R77	150KΩ	½	73051		
R78	150KΩ	½	73051		Note 5
R79	330KΩ	½	73039		
R80	220KΩ	½	73153		
R81	330KΩ	½	73060		
R82	220KΩ	½	73060		
R83	10KΩ	3	73437		
R84	1Meg	3	73441		Note 5
R85	12KΩ	4	73847	1 QAA-12K	
R86	10KΩ	4	73837		
R87	100KΩ	3	73149	BTS-100K	

Note 1. Use with heat dissipating band. If band is not used, the wattage must be doubled.
Note 2. Not used in chassis stamped prior to order 836.
Note 3. A 12KΩ 1 W, 5% resistor is used in chassis stamped prior to order 836.
Note 4. Not used in some versions.
Note 5. Not used in chassis stamped order 836 or higher.
Note 6. A 100KΩ 1W 5% resistor is used in chassis stamped order 836 or higher.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: Halldorson PART No.	REPLACEMENT DATA: Merit PART No.	REPLACEMENT DATA: Stancor PART No.	REPLACEMENT DATA: Thordorson PART No.	REPLACEMENT DATA: Triad PART No.
T1	117VAC 60 CY	550VCT 5A	5V ② 3A	6.3V ③ 5.2A	29058A				24833 ①	

① Tape low HV winding. Tape 5V ② 3A winding. Parallel 6 phase 6.3V ③ 5A windings for Sec. 3.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: Packard-Bell PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordorson PART No	Triad PART No
T2	Horiz. Output Trans.	29055B	FB420 & RF800 *	HVO-54 * 1		X129 * 1	A-8255 * 1	F1Y-75 * 1	D-49 * 1
T3	Vert. Output Trans.	29454	21805 *	A-3039	32ET1	V312	A-8141	26254	A-104X
		29454C ②	21806	A-3039	32ET1	V312	A-8141	26254	A-104X
T4A	Yoke (90°) Horiz. (25MC)	29560A					DY-23A ③		
B	Vert.) (59MC)	29058A ③							

1 Drill new mounting hole(s).
2 Alternate Packard-Bell Part No.
3 Yoke rear cover & centering device.
4 Use original rear cover & centering device.
5 Use original horizontal yoke damping network.
6 RF800 not required with chassis mentioned in note 8 below.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL (CONNECTIONS)	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordorson Replacement Connections	Triad Replacement Connections
	8	5	5		5	5	5	5
	5	4	4		4	4	4	8
	4	N.C. See Note ⑧	N.C. See Note ⑧		N.C. See Note ⑧	N.C. See Note ⑧	N.C. See Note ⑧	N.C. See Note ⑧
	2	Jumper to 1 & 7			Jumper to 1 & 7	Jumper to 1 & 7	Jumper to 1 & 7	2 & 3
	1	See Note ⑥	6		8	8	8	4
Connect Width Coil Here:		Terms #1 & #2 of RF800 Across 3 & 4						
Special Notes:		⑧	⑦ ⑧		⑧	⑧	⑧	⑧

⑧ To reduce yoke "ringing", install 1000Ω ② ½W in series with C71 across terms #2 & #1 of horizontal yoke.
⑦ Connect term #4 of RF800 to ground, term #3 to R86 (original transformer term #1 lead). If the picture is out of phase, reverse these connections.
⑥ In chassis marked 886 (or higher) original transformer term #1 is not used as source of horizontal AFC pulse. In those chassis, ignore data shown pertaining to original term #1. Also, no jumper will be necessary in data shown for original term #2.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: Packard-Bell PART No	Halldorson PART No	Merit PART No	Stancor PART No	Thordorson PART No	Triad PART No	NOTES
T5	4.7KΩ	3-4Ω	29435A	Z1107	A2930	A3850	24851	S-3X	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: Packard-Bell PART No.	QUAM PART No.	RCA TYPE No	NOTES
SP1	4"	PM	3-4Ω	83014 1	4A07	22351	1 Used in Models 21ET1, U, 24ET1, U
	6" x 9"	PM	3-4Ω	83012 2	6A3	23351	2 Used in Model 21SC1, U

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: Packard-Bell PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching Trans.	0Ω	0Ω					
L2	Ant. Matching Trans.	0Ω	0Ω					
L3	IF Trap Coil	0Ω						
L4	FM Trap	1.3Ω		73064				
L5	Ant., RF, Mixer Grid, Osc. Coils	0Ω						
L6	RF Coil	0Ω						
L7	RF Coil	0Ω						
L8	Conv. Plate	.1Ω						
L9	1st Video IF	.1Ω		29584		TV-131		
L10	2nd Video IF	.1Ω	.1Ω	29585	17-4523	TV-130	6219	
L11	3rd Video IF	.1Ω	.1Ω	29586A	17-4524	TV-130	6219	
L12	4th Video IF	.1Ω	.1Ω	29587	17-4523	TV-130	6219	
L13	Series Peaking Coil	1.5Ω		29586			6213	10 Microhenries
L14	Shunt Peaking Coil	3Ω		29608	19-4180	TV-135	6179	180 Microhenries, Wound on 2W33 resistor
L15A	4.5MC Trap	1.7Ω						
B	Sound IF	2.6Ω		29582				
L16	Shunt Peaking Coil	18Ω		29577	19-4400 *		6136 *	400 Microhenries, Wound on 1EK0 resistor
L17	Ratio Det.	3.8Ω	.3ΩCT	29054	17-3493	TV-115 *	1498	Tertiary Winding, 7Ω

* Parallel with 12KΩ resistor.
▪ Use adaptor plate.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: Packard-Bell PART No	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No	Ram PART No.	Thordorson PART No	NOTES
L18	60Ω		29589A	19-1676	TV-163	6210			HB-6	

FILTER CHOKE

ITEM No	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE @ CURRENT 1000 (%)	REPLACEMENT DATA: Packard-Bell PART No	Halldorson PART No	Merit PART No	Stancor PART No	Thordorson PART No	Triad PART No
L19	.210A	35.5Ω	18H	37058A 3 37058B 3	C3040	C3998 ①	C2328 ①	28C41	C-8X 1

1 Drill new mounting hole.
2 Used in some versions.

PARTS LIST AND DESCRIPTIONS (Continued)

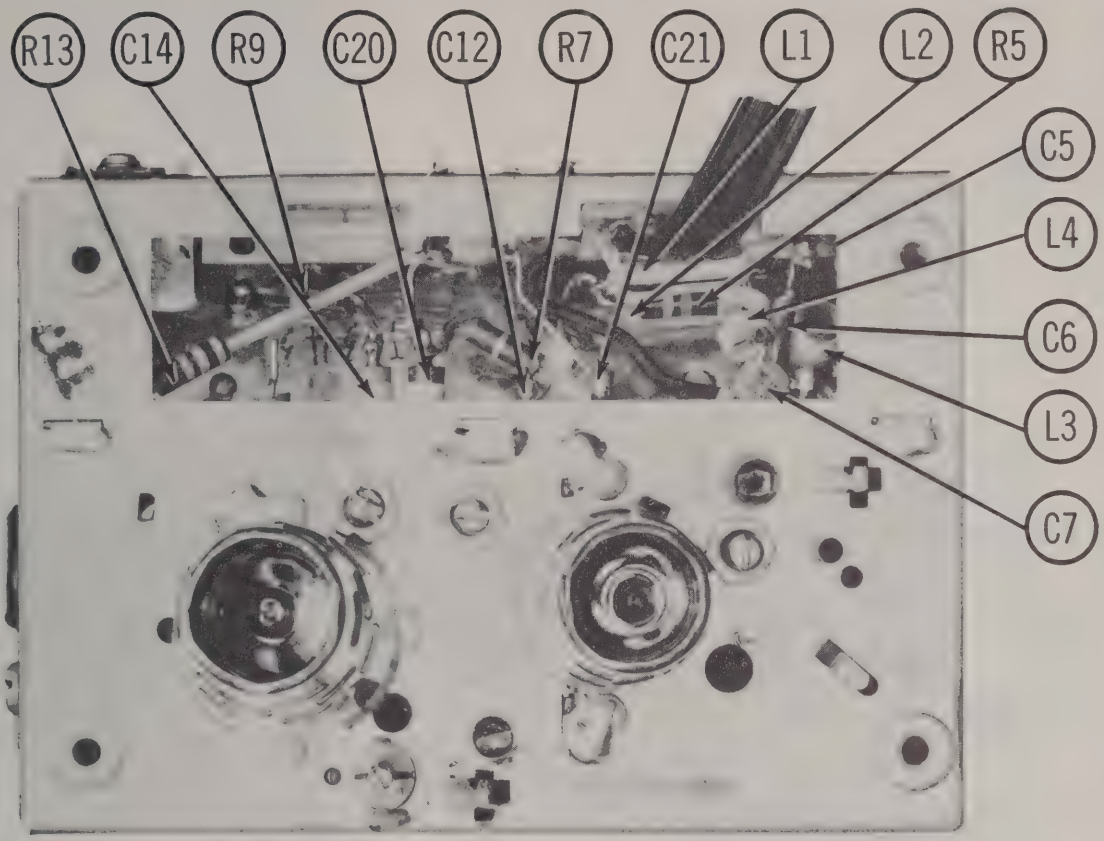
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Packard-Bell PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	3/16A 125V	45006		313. 187 (3AG S/B 3/16A)	357001	MDL 3/16	4405

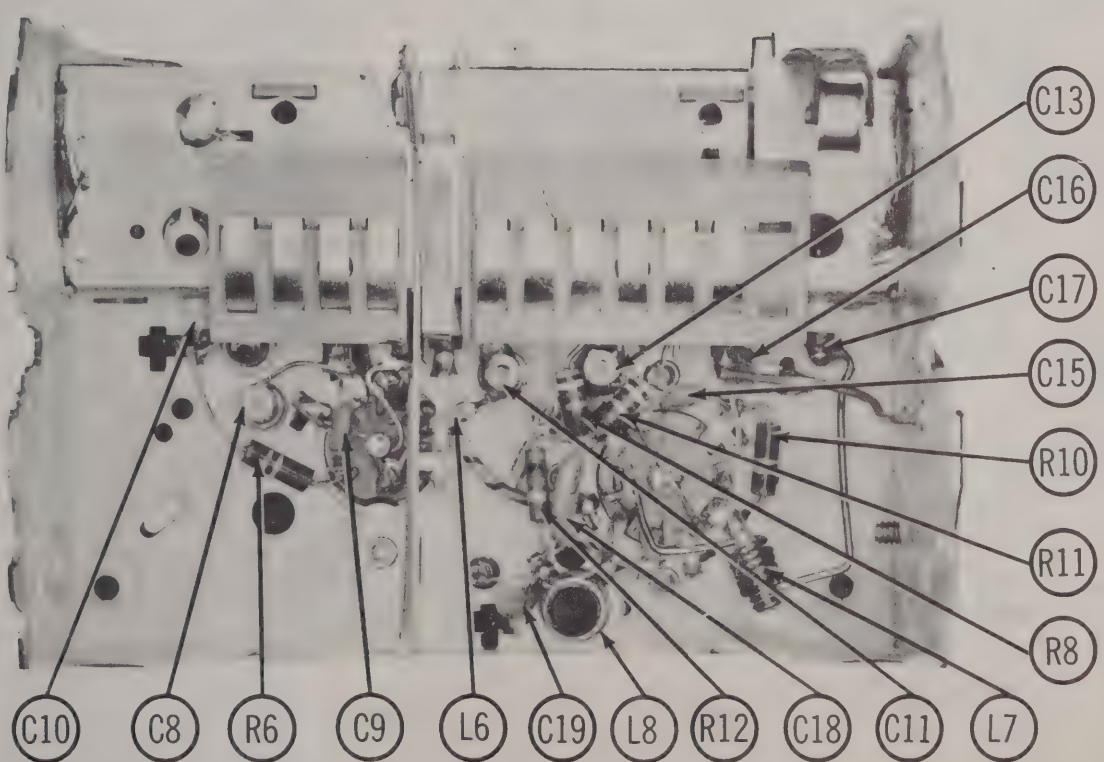
MISCELLANEOUS

ITEM No.	PART NAME	Packard-Bell PART No.	NOTES
M2	Dial Light	54002	#47
M3	Tuner	10546	VHF-Chassis 88S1
M4	Tuner	10544	VHF-UHF-Chassis 88S1U
M5	Integrator	23980	Vertical-Centralab Part #PC-104, Sprague Part #103C12
M6	Switch	86306A	Local-Distance-(SPDT-Rotary, Wafer Type)
M7	Centering Device	34045A	Includes Deflection Yoke (T4) Rear Cover
M8	Ion Trap	28106A	
	Cabinet		Specify Model Number & Finish
	Knob	52143A	VHF Fine Tuning-Models 21ST1, 21SC1, 24ST1
	Knob	52144A	VHF Channel Selector-Models 21ST1, 21SC1, 24ST1
	Knob	52135	Fine Tuning-Models 21ST1U, 21SC1U, 24ST1U
	Knob	52137	VHF Tuning-Models 21ST1U, 21SC1U, 24ST1U
	Knob	52138	UHF Dial-Models 21ST1U, 21SC1U, 24ST1U
	Knob	52120	Brightness or Vertical Hold
	Knob	52121	Horizontal Oscillator
	Knob	52123A	Local-distance Switch
	Knob	52134A	Contrast
	Knob	52136B	On-off-volume
	Safety Glass	55064	Models 21ST1, U, 21SC1, U
	Safety Glass	55062B	Models 24ST1, U

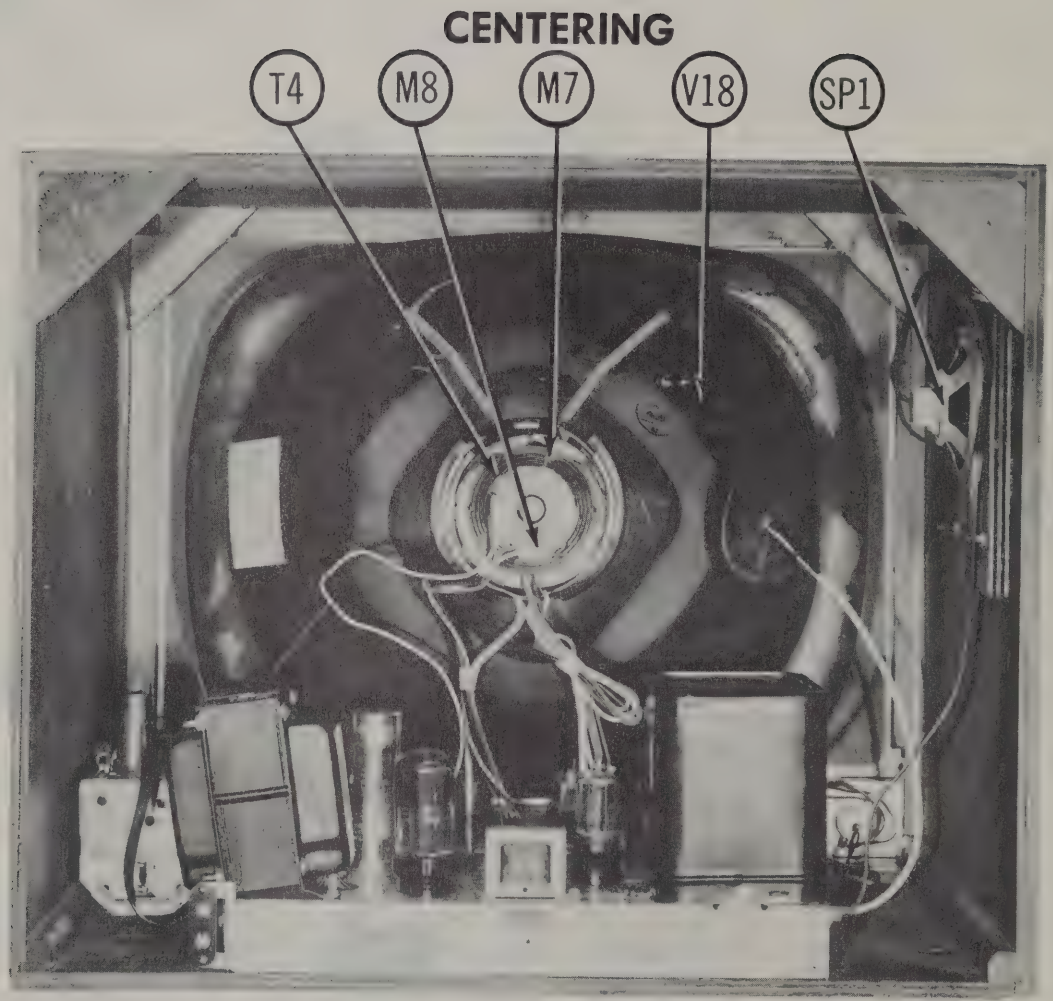
Note 1. Later production versions use vertical integrator Part No. 23818. When integrator Part No. 23818 is used C46 is omitted.



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Adjust the horizontal oscillator slug (L18) (labeled "Horizontal Hold" on front of set) until the picture synchronizes horizontally. The correct setting of L18 slug is approximately half-way between the points where the picture tears.

Adjust the horizontal drive control (R2B) in a clockwise direction as far as possible without the presence of vertical white lines or compression near the center of the picture.

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . unless it has been purchased as part of a complete volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

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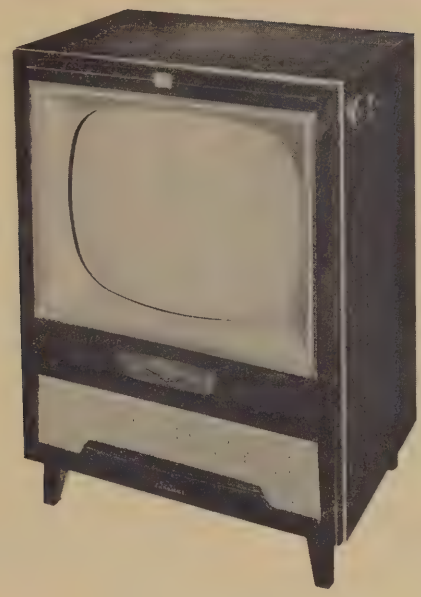

RCA VICTOR MODEL 24-D-655 (Ch. KCS97U)

TRADE NAME	RCA Victor	MODELS	CHASSIS	TUNER
		21-T-635, 21-T-6125, 21-T-6127	KCS97	KRK38B
		21-T-635U, 21-T-6125U, 21-T-6127U	KCS97A	KRK38C
		24-D-679	KCS97AA	KRK39
		24-D-679U	KCS97AB	KRK39A
		24-D-673, 24-D-676	KCS97AC	KRK39
		24-D-673U, 24-D-676U	KCS97AD	KRK39A
		21-D-641, 21-D-645, 21-D-647, 21-D-648	KCS97D	KRK38
		21-D-641U, 21-D-645U, 21-D-647U, 21-D-648U	KCS97E	KRK38A
		21-D-667, 21-D-670	KCS97F	KRK39
		21-D-667U, 21-D-670U	KCS97H	KRK39A
		21-D-652	KCS97J	KRK38
		21-D-652U	KCS97K	KRK38A
		24-T-6142	KCS97N	KRK38F
		24-T-6142U	KCS97P	KRK38E
		24-T-6285, 24-T-6287	KCS97R	KRK38F
		24-T-6285U, 24-T-6287U	KCS97T	KRK38E
		24-D-655, 24-D-658	KCS97U	KRK38
		24-D-655U, 24-D-658U	KCS97W	KRK38A

MANUFACTURER Radio Corporation of America, RCA Victor Television Division, Camden 2, N.J.
TYPE SET Television Receiver
TUBES Nineteen
POWER SUPPLY 110-120 Volts AC-60 Cycles RATING 1.76 Amp. @ 117 Volts AC
TUNING RANGE Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

INDEX

Alignment Instructions ..... 5 thru 8
Drive Cord Stringing (VHF) 20
Disassembly Instructions 1
Horizontal Sweep Circuit Adjustments 21
Parts List and Descriptions ..... 13 thru 16
Photographs
Cabinet-Rear View 21
Capacitor Identification 3, 10
Chassis-Top View 17
RF Tuner 19, 20
Photographs (Cont)
Resistor Identification 4, 9
Trans., Inductor & Alignment Identification 17
Resistance Measurements 16
Servicing in the Field 1
Schematic (Alternate Tuner) 12
Schematic (TV) 2
Tube Failure Check Chart 11
Tube Placement Chart (Bottom View) 18
Tube Placement Chart (Top View) 11

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PHOTOFACT* Folder

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RETMA MEMBER

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39[illegible] MI
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RCA VICTOR MODELS 21-D-641, U, 21-D-645, U, 21-D-647, U, 21-D-648, U, 21-D-652, U, 21-D-667, U, 21-D-670, U, 21-T-635, U, 21-T-6125, U, 21-T-6127, U, 24-D-655, U, 24-D-658, U, 24-D-673, U, 24-D-676, U, 24-D-679, U, 24-T-6142, U, 24-T-6285, U, 24-T-6287, U (Ch. KCS97, A, AA, AB, AC, AD, C, D, E, F, H, J, K, N, P, R, T, U, W)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

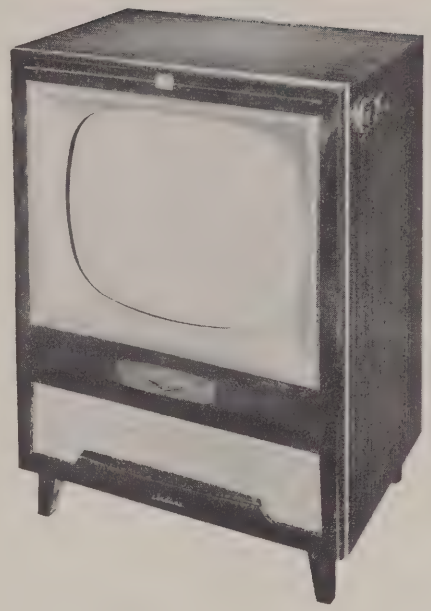
1. Remove 8 push-on type control knobs from front and side panels of cabinet.
2. Loosen 3 wood screws. Remove 2 spring clips. Disconnect antenna plugs. Remove rear cover.
3. Disconnect 4 speaker plugs, picture tube socket, HV lead and yoke plug.
4. Remove 4 chassis bolts. Remove chassis.

TUNER REMOVAL

1. Loosen square set screw holding tension roller on indicator belt and disengage belt.
2. Remove indication lamp assembly.
3. Remove wires from clamps.
4. Remove 3 hex nuts holding tuner assembly.
5. Remove tuner chassis and assembly.

SPEAKER REMOVAL

1. Lay cabinet on one side on a soft surface.
2. Remove 8 speaker nuts. Remove 2 speakers.



CHASSIS

KCS97, A, AA, AB, AC, AD, D, E, F, H, J, K, N, P, R, T, U, W.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the VHF tuner oscillator circuit, it is necessary to remove the RF tuner chassis from the cabinet.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove rear cover and remove 8 flat spring clips holding metal trim to the cabinet front. Remove metal trim and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 11

SPECIAL ADJUSTMENTS

A. AGC And Sync Stabilizer Control Adjustments

While receiving the strongest signal in that area, switch off channel, then back again. If the picture shows signs of pulling or overloading, set the sync stabilizer control (R6) maximum counter clockwise. Turn the AGC control (R7) clockwise slowly until a slight bend is noted in picture, then back until picture appears stable.
Turn the horizontal hold control as far counter clockwise as possible without making horizontal sync unstable. Then turn R6 clockwise until a slight bend is noted in picture, then back counter clockwise until bend disappears. Return horizontal hold adjustment to its center hold range position.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The horizontal hold control (L32) is located on the front control panel of the chassis and is used as horizontal hold adjustment.
If horizontal sync cannot be brought in by adjusting the horizontal hold, set it at approximately its mid-range position and synchronize the picture by adjusting the horizontal waveform slug (B1).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (A49) located on bottom of chassis.

FUSES

One fuse is used for horizontal and vertical sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the corners are at right angles.

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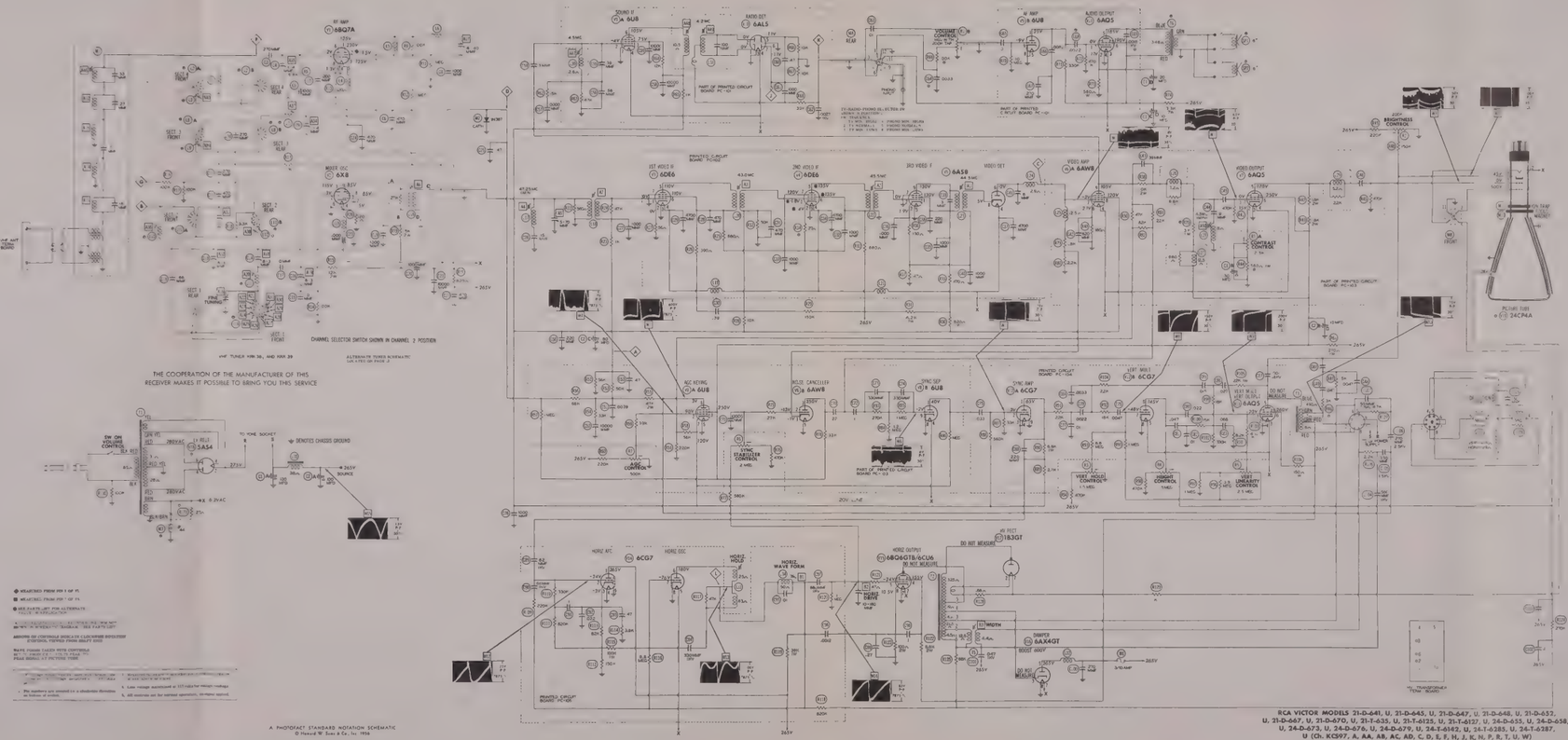
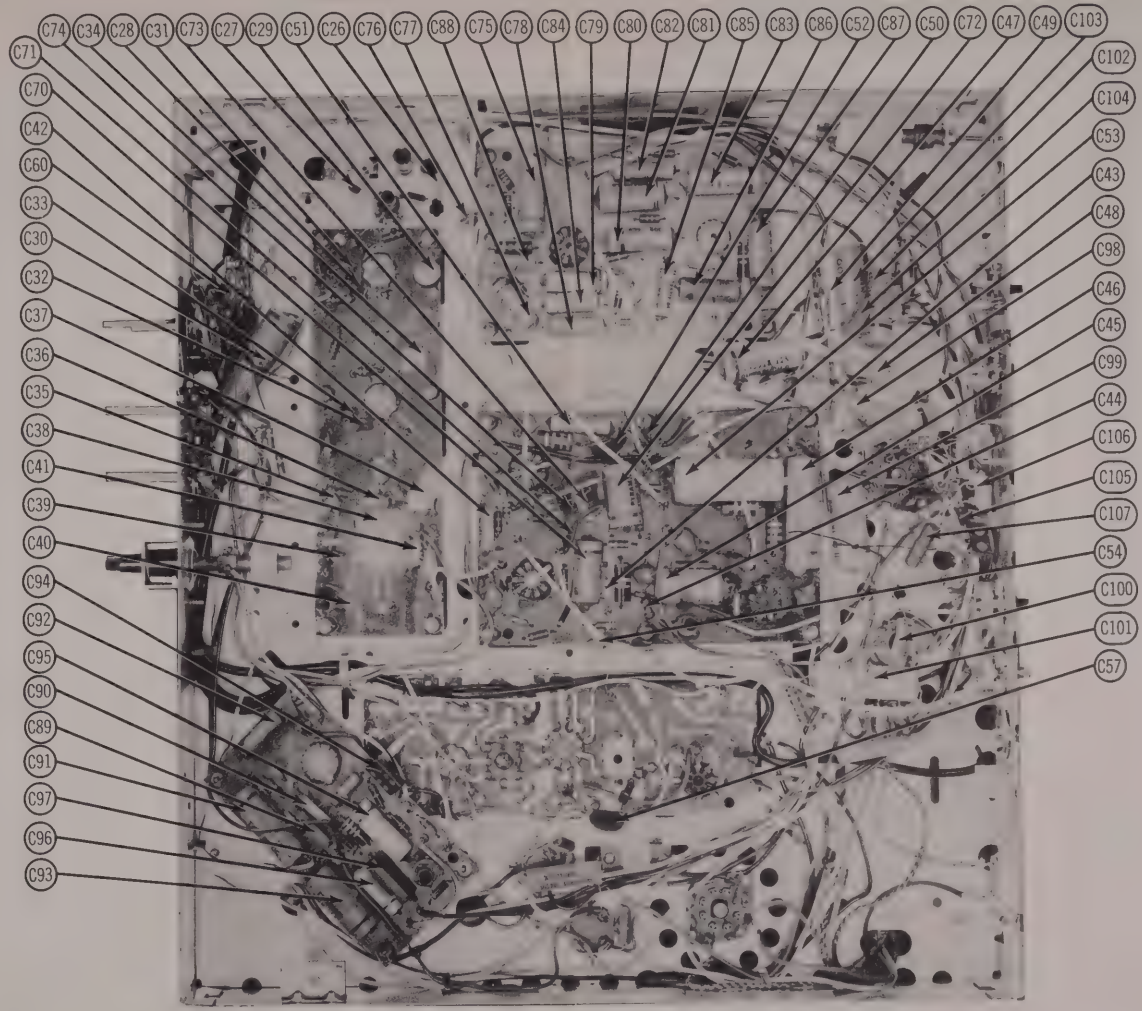


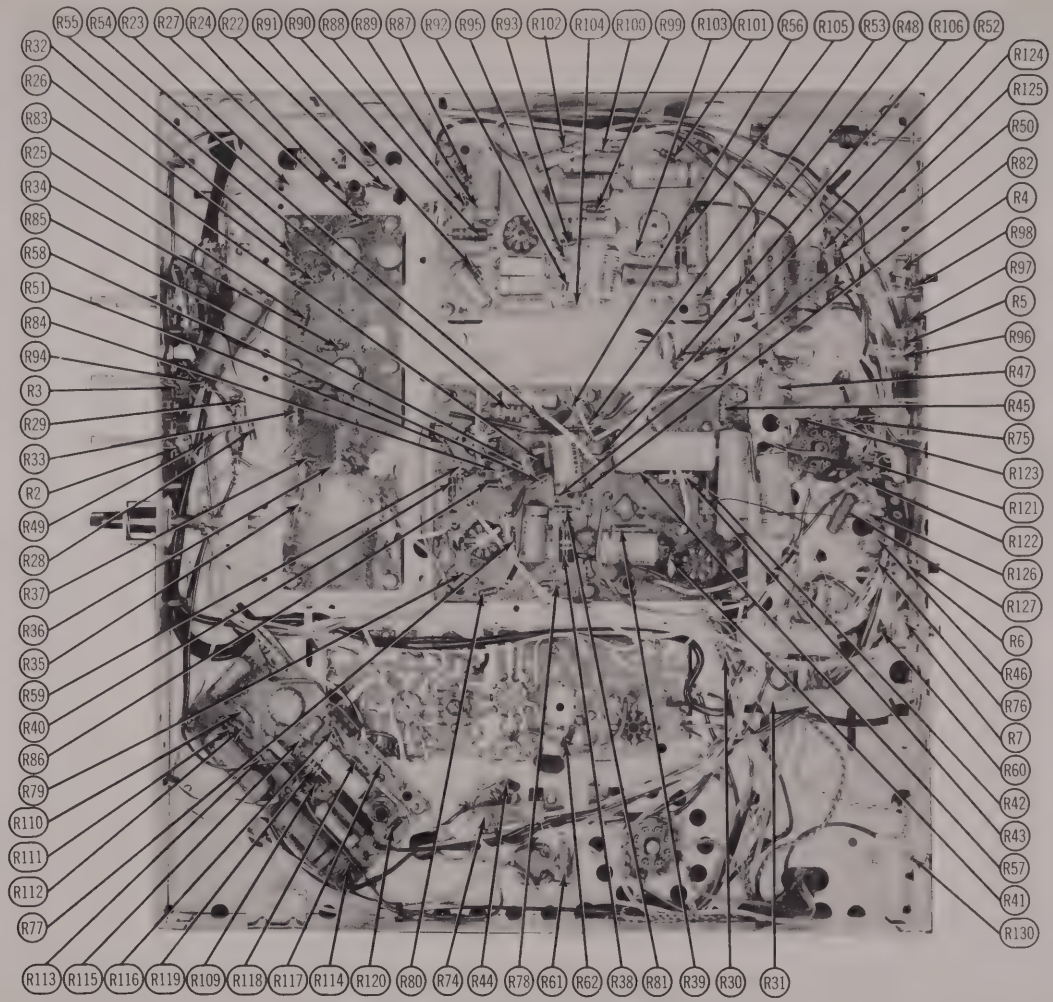
RCA VICTOR MODELS 21-D-641, U, 21-D-645, U, 21-D-647, U, 21-D-648, U, 21-D-652, U, 21-D-667, U, 21-D-670, U, 21-T-635, U, 21-T-6125, U, 21-T-6127, U, 24-D-655, U, 24-D-658, U, 24-D-673, U, 24-D-676, U, 24-D-679, U, 24-T-6142, U, 24-T-6285, U, 24-T-6287, U (Ch. KC97, A, AA, AB, AC, AD, C, D, E, F, H, J, K, N, P, R, T, U, W)

RCA VICTOR MODELS 21-D-641, U, 21-D-645, U, 21-D-647, U, 21-D-648, U, 21-D-652, U, 21-D-667, U, 21-D-670, U, 21-T-635, U, 21-T-6125, U, 21-T-6127, U, 24-D-655, U, 24-D-658, U, 24-D-673, U, 24-D-676, U, 24-D-679, U, 24-T-6142, U, 24-T-6285, U, 24-T-6287, U (Ch. KC97, A, AA, AB, AC, AD, C, D, E, F, H, J, K, N, P, R, T, U, W)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

RCA VICTOR MODELS 21-D-441, U; 21-D-445, U; 21-D-447, U; 21-D-448, U; 21-D-452, U; 21-D-667, U; 21-D-670, U; 21-T-635, U; 21-T-637, U; 24-D-635, U; 24-D-636, U; 24-D-673, U; 24-D-675, U; 24-D-679, U; 24-T-6142, U; 24-T-6218, U; 24-T-6287, U (Ch. KC597, A, AA, AB, AC, AD, C, D, E, F, H, J, K, N, P, R, T, U, W)



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

RCA VICTOR MODELS 21-D-641, U, 21-D-645, U, 21-D-647, U, 21-D-648, U, 21-D-652, U, 21-D-667, U, 21-D-670, U, 21-T-635, U, 21-T-6125, U, 21-T-6127, U, 24-D-655, U, 24-D-658, U, 24-D-673, U, 24-D-676, U, 24-D-679, U, 24-T-6142, U, 24-T-6285, U, 24-T-6287, U (Ch. KCS97, A, AA, AB, AC, AD, C, D, E, F, H, J, K, M, P, R, T, U, W)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis. The horizontal oscillator tube (V14) may be removed to eliminate the high voltage shock hazard. If V14 is removed during alignment, connect the negative lead of a 20 volt bias supply to pin 2 (grid) of the noise canceller tube (V6B). Connect positive lead to chassis.

VIDEO IF ALIGNMENT FOR VHF MODELS ONLY

Set the AGC control (R7) to its fully clockwise position.
Set the sync stabilizer control (R6) to its fully counter clockwise position.
Connect the negative lead of a variable bias supply to point Ⓐ. Positive lead to chassis. Set for -5 volts at point Ⓐ.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.0015MFD Ceramic Capacitor	High side to point Ⓐ. Low side to chassis.	Not used	44.5MC	Any unused channel	USE VTVM. DC probe to point Ⓒ. Common to chassis.	A1	Attenuate generator output to maintain not more than 3 volts on TVM. Adjust for maximum deflection.
2.	"	"	"	45.5MC	"	"	A2	"
3.	"	"	"	43.0MC	"	"	A3	"
4.	"	"	"	47.25MC	"	"	A4	Increase generator output to maintain 3 volts on VTVM. Adjust for MINIMUM deflection.
5.	"	High side to point Ⓑ. Low side to tuner chassis.	44MC (10MC Swp)	42.5MC 45.75MC	4	Vert. Amp. of scope thru detector (Fig. 1) to pin 5 (plate) of first video IF amplifier tube (V3). Low side to chassis.	A5, A6, A7	Adjust for -5 volts bias at point Ⓐ. Clip a 330 ohm resistor from pin 2 (grid) of 3rd. video IF amplifier tube (V5A) to chassis. Connect a 180Ω carbon resistor from plate to screen (pins 5 and 6) of first video IF amplifier tube (V3). Preset A5 (trimmer) to MINIMUM capacity. If a separate signal generator is used for a marker, couple it loosely to detector as in Fig. 1. Attenuate output of sweep generator to give .3 to .5 volts peak to peak in scope. Adjust A6 and A7 for maximum gain with 45.75MC marker at 75% of maximum response as in Fig. 2. Adjust A5 to place 42.5MC marker at 70% response on curve as in Fig. 2. Disconnect the 180Ω and 330Ω resistors. Remove scope and detector from pin 5 of first video IF amplifier tube (V3).
6.	"	"	"	42.5MC 45.0MC 45.75MC	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A1, A2, A3	Attenuate output of sweep generator to obtain 3 to 5 volts peak to peak on scope. If a separate signal generator is used, couple it loosely to pin 1 (grid) of 1st. video IF amplifier tube (V3). Retouch A1, A2 and A3 if necessary to obtain response curve similar to Fig. 3.
7.	"	"	"	41.25MC	"	"	A1, A3	Increase sweep generator output ten times and notice attenuation at 41.25MC. Adjust A1 and A3 to set 41.25MC marker at approximately 30 times down with response curve as in Fig. 3.
8.	Two 130Ω Carbon Resistors	Across antenna terminals within 130Ω in each lead.	"	42.5MC 45.0MC 45.75MC	All VHF channels separately	"	A1, A2	Couple marker generator loosely to first video IF amplifier tube (Grid). Connect negative lead of a second bias supply to point Ⓓ. Positive lead to chassis. Adjust for -3 volts bias at point Ⓓ. SLIGHTLY retouch A1 and A2 to correct any overall tilt that is approximately the same on all VHF channels. Continue alignment with step 12.

VIDEO IF ALIGNMENT FOR VHF-UHF MODELS

Same instructions as under "Video IF Alignment For VHF Models only".

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.0015MFD Ceramic Capacitor	High side to point Ⓐ. Low side to chassis.	Not used	44.5MC	Any unused channel	USE VTVM. DC probe to point Ⓒ. Common to chassis.	A1	Attenuate generator output to maintain not more than 3 volts on VTVM. Adjust for maximum deflection.
2.	"	"	"	45.5MC	"	"	A2	"
3.	"	"	"	43.0MC	"	"	A3	"
4.	"	"	"	47.25MC	"	"	A4	Increase generator output to maintain 3 volts on VTVM. Adjust for MINIMUM deflection.
5.	"	High side to point Ⓑ. Low side to tuner chassis.	44MC (10MC Swp)	42.5MC 45.75MC	4	Vert. Amp. of scope thru detector (Fig. 1) to pin 5 (plate) of first video IF amplifier tube (V3). Low side to chassis.	A5, A6, A7	Adjust for -5 volts bias at point Ⓐ. Clip a 330 ohm resistor from pin 2 (grid) of 3rd. video IF amplifier tube (V5A) to chassis. Connect a 180Ω carbon resistor from plate to screen (pins 5 and 6) of first video IF amplifier tube (V3). Preset A5 (trimmer) to MINIMUM capacity. If a separate signal generator is used for a marker, couple it loosely to detector as in Fig. 1. Attenuate output of sweep generator to give .3 to .5 volts peak to peak on scope. Adjust A6 and A7 for maximum gain with 45.75MC marker at 75% of maximum response on curve as in Fig. 2. Disconnect the 180Ω and 330Ω resistors. Remove scope and detector from pin 5 of first video IF amplifier tube (V3).
6.	.001MFD	"	"	42.5MC 45.0MC 45.75MC	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A1, A2, A3	Attenuate output of sweep generator to obtain 3 to 5 volts peak to peak on scope. If a separate signal generator is used for a marker, couple it loosely to pin 1 (grid) of first video IF amplifier tube. Retouch A1, A2 and A3, if necessary to obtain response curve similar to Fig. 3.

ALIGNMENT INSTRUCTIONS (cont)

VIDEO IF ALIGNMENT FOR VHF-UHF MODELS (CONT.)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.001MFD	High side to point Ⓒ. Low side to tuner chassis.	44MC (10MC Swp)	41.25MC	4	Vert. Amp. to point Ⓒ. Low side to chassis.	A1, A3	Increase sweep generator output ten times and notice attenuation at 41.25MC. Adjust A1 and A3 to set 41.25MC marker 30 times down with response curve as in Fig. 3.
8.	1000Ω Carbon Resistor in series with .0015MFD Ceramic Capacitor	High side of sweep generator to front terminal of 1N83 crystal holder. Low side to tuner chassis. Use very short leads.	797MC (10MC Swp)	42.5MC 45.75MC	Between channels 68 and 69	Vert. Amp. thru detector (Fig. I) to junction of 2200Ω and .0015MFD (see remarks). Low side to chassis.	A8, A9	Set tuner to UHF position. Connect a 2200 carbon resistor in series with a .0015MFD ceramic capacitor between pin 1 (plate) of 6BQ7A and chassis with the capacitor end connected to pin 1 of 6BQ7A and resistor end to chassis. If separate marker generator is used couple it loosely to detector (Fig. I). Connect a second bias supply to point Ⓓ. Positive side to chassis of tuner. Adjust -3 volts at point Ⓓ. Attenuate sweep generator for .5 volts peak to peak on scope. Adjust A8 and A9 for maximum gain with response as in Fig. 4.
9.	"	"	"	42.5MC 45.75MC	"	Vert. Amp. thru detector (Fig. I) to point Ⓒ. Low side to chassis.	A10, A11	Tuner in UHF position. Loosely couple marker generator to detector (Fig. I). If necessary, adjust A10 and A11 to place 45.75MC marker at peak of curve with MINIMUM tilt. Remove 2200 resistor and .0015MFD capacitor from pin 1 of 6BQ7A tube. Remove detector and scope from point Ⓒ.
10.	Two 130Ω Carbon Resistors	Across antenna (VHF) terminals with 130Ω in each lead.	44MC (10MC Swp)	42.5MC 45.0MC 45.75MC	All VHF channels separately	Vert. Amp. to point Ⓒ. Low side to chassis.	A1, A2	Couple marker generator loosely to first video IF amplifier grid. Check for response curve similar to Fig. 3 on all VHF channels. SLIGHTLY retouch A1 and A2 if necessary to correct any overall tilt.
11.	300Ω Pad	Across UHF antenna terminals thru 300Ω pad (Fig. 5)	See freq. chart of UHF channels	"	Check all UHF channels	"	A10, A11	Couple marker generator loosely to first video IF amplifier grid. Check for response similar to Fig. 3 on all UHF channels. If necessary SLIGHTLY retouch A10 and A11 to correct for any overall tilt. Do not retouch A1, A2, A3, A6, A7, A8 or A9 in this step. Remove all test equipment. Disconnect both bias supplies.

ANTENNA MATCHING UNIT ALIGNMENT

The antenna matching unit has been properly aligned at the factory. The RF unit is aligned with a particular antenna matching unit in place. If a new antenna unit is installed, the RF unit should not be attempted without the proper alignment facilities.
The FM trap adjustment (A46) which is located on the antenna matching unit may be adjusted without seriously affecting the RF alignment.
Disconnect the lead from the FM trap coil (adjustment A46) in the channel selector switch. Use a short jumper to connect point Ⓔ on the matching unit thru a .001MFD capacitor to pin 1 grid of second video IF amplifier tube (V4). Remove the first video IF amplifier tube (V3) from its socket. Cover of the antenna matching unit must be in place during alignment. Connect the negative lead of a bias supply to point Ⓐ. Connect the positive lead to chassis. Adjust for -5 volts at point Ⓐ. NOTE: Adjustments A18 thru A18 are adjusted by expanding or compressing coil turns, except in antenna matching units in which capacitors in circuit are variable capacitors.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horitontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	Not used	45.75MC (400%Mod)	Any	Vert. Amp. to point Ⓒ. Low side to chassis.	A12	Set scope gain to maximum and adjust for MINIMUM 400% indication on scope.
13.	"	"	"	41.25MC (400%Mod)	"	"	A13	"
14.	300Ω Pad (Fig. 5)	Across antenna terminals thru 300Ω pad. (Fig. 5)	50MC 52MC 53MC 80MC	50MC (20MC Swp)	"	Vert. Amp. thru detector probe (Fig. I) to point Ⓕ. Low side to chassis	A14, A15	Remove the .001MFD capacitor from point Ⓕ to pin 1 of V4. Connect a 300Ω, ½ watt carbon resistor from point Ⓕ to chassis. Adjust A14 and A15 to obtain response curve similar to Fig. 6. Repeat steps 12, 13 and 14 until no further improvement is noted. Remove the 300Ω resistor and the detector probe between point Ⓕ and chassis. Replace V3 in its socket.

VHF TUNER ALIGNMENT

An RF unit which is operative and requires only minor touch-up adjustments will require no presetting of adjustments.
This unit is properly aligned at the factory and under normal use should not require alignment unless components are changed to affect alignment.
When complete alignment is necessary make the following preadjustments:
1. Preset A16 all the way out.
2. Turn A6 so that slug is all the way out.
3. Set channels 7 thru 13 oscillator slugs one turn from tight.
Disconnect the link from terminal of L16 (converter plate transformer) and shunt the terminals of L16 with a 390 carbon resistor.
Tuner alignment as outlined below requires the use of a heterodyne frequency meter. The limits of oscillator injection are 2 volts minimum and 5.5 volts maximum measured at point Ⓖ with a VTVM. Connect negative terminal of a variable bias supply to point Ⓓ. Positive lead to tuner chassis. Adjust for -3 volts bias at point Ⓓ.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horisontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Direct	High side to point Ⓕ. Low side to chassis.	Not used	43.5MC (400%Mod)	2	Vert. Amp. to point Ⓚ. Low side to chassis.	A17	Disconnect bias at point Ⓓ and short out AGC at point Ⓗ to chassis. Adjust A17 for MINIMUM 400% indication on scope. If necessary A17 may be adjusted in the field to provide additional rejection of a specific frequency. Exercise care so that A17 is not tuned into channel 2, reducing that channel's sensitivity. Remove short from tuner AGC (point Ⓗ) and reconnect -3 volts bias at point Ⓓ.

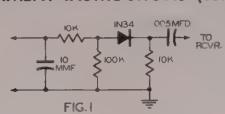


FIG. 1

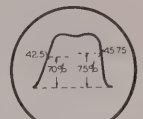


FIG. 2

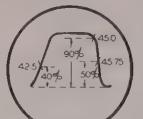


FIG. 3

FIG. 4

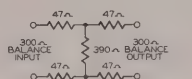


FIG 5

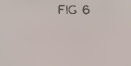


FIG 6

FIG. 7

FIG. 8

FIG. 9

VHF TUNER ALIGNMENT (CONT.)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.		RF input of heterodyne frequency meter to end of insulated wire inserted in hole provided for adjustment of A32. Be careful that wire does not touch any of the tuned circuits as this may cause oscillator shift.	Not Used	Set Freq. meter to 227MC	8	Not used	A18, A19, A16	Preset A18 to read -3 volts at point Ⓓ. Turn fine tuning control fully clockwise. Adjust A19 for audible beat on frequency meter. Adjust A16 clockwise until beat note just begins to change, then turn one full turn in same direction. Return fine tuning control to its mid-range position.
17.	NOTE: If channel 8 oscillator frequency cannot be reached by adjustment of A19, switch to channel 13 and A30 for channel 13 oscillator frequency. Switch to channel 13 and adjust A31 for channel 13 oscillator frequency. Continue to channel 8 adjusting proper oscillator trimmer to obtain proper oscillator frequency on each channel. Also on channel 8 adjust A19 for channel 8 oscillator frequency. Switch to channel 13 and adjust A20, then switch back to channel 8 and adjust A19 again.							
18.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	8	Vert. Amp. to point Ⓒ. Low side to chassis.	A32, A33, A34, A35	Set A6 fully counter clockwise. Set scope gain to maximum and attenuate generator output for MINIMUM input signal that will produce usable pattern on scope. Adjust for response curve similar to Fig. 6. Adjust A35 for maximum amplitude between markers. A34 affects bandpass. A33 affects tilt when A35 is properly adjusted. A32 affects the response bandwidth.
19.	Connect the DC probe of VTVM to point Ⓘ. Common to chassis. Adjust A18 for -3 volts at point Ⓘ. Repeat steps 17 and 18 until proper response is obtained.							
20.		Connect frequency meter as in step 18.	Not used	Freq. meter to 207MC	13	Not used	A20	Rotate fine tuning control maximum clockwise. Adjust A20 for audible beat on frequency meter. SLIGHTLY overshoot the adjustment as additional turn in the same direction, then in the same direction, then adjust A16 to again obtain an audible beat.
21.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A36, A37	Adjust for response curve similar to Fig. 4. Turn off generator and check oscillator injection voltage at point Ⓖ using VTVM as in step 19. If A16 required adjustment turn sweep generator back on and recheck channel 13 response. If necessary, retouch A36 and A37 for desired response.
22.		Connect frequency meter as in step 16.	Not used	Freq. meter to 227MC	8	Not used	A16	Check for audible beat on frequency meter. If necessary adjust A16 for proper oscillator frequency.
23.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	8	Vert. Amp. to point Ⓒ. Low side to chassis.	A32, A33, A34, A35	If necessary, retouch A32 thru A35 to obtain response similar to Fig. 6. If A32 required adjustment, turn off generator and switch back to channel 13 and check oscillator injection voltage as in step 19. If necessary, repeat steps 21, 23 and 23 until proper response is obtained.
24.		Connect frequency meter as in step 16.	Not used	Freq. meter to 129MC	6	Not used	A27	Set fine tuning control to its mid-range position. Adjust A27 for audible beat on frequency meter.
25.	Two 130Ω Carbon Resistor	Across antenna terminals with 130Ω in each lead.	85MC (20MC Swp)	83.25MC 87.75MC	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A38, A39 A40	Adjust for response curve similar to Fig. 7. Check oscillator injection voltage as in step 19. If necessary readjust A18.
26.	If A18 required readjustment switch receiver and generator to channel 8. Readjust A32 for response similar to Fig. 4. Recheck A16 and A19 for proper oscillator frequency.							
27.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (20MC Swp)	83.25MC 87.75MC	6	Vert. Amp. to point Ⓒ. Low side to chassis.		Check for response curve similar to Fig. 7. Check oscillator injection voltage for each channel at point Ⓖ. If markers fall below 80% on any channel, retouch A38, A39 and A40 to obtain response curve within proper limits.
			79MC (20MC Swp)	77.25MC 81.75MC	5			
			69MC (20MC Swp)	67.25MC 71.75MC	4			
			63MC (20MC Swp)	61.25MC 65.75MC	3			
			57MC (20MC Swp)	55.25MC 59.75MC	2			
28.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig. 7. Check oscillator injection voltage for each channel at point Ⓖ. If marker falls below 80% on any one channel retouch A32, A33 and A34 to obtain response curves within proper limits.
			207MC (10MC Swp)	205.75MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (20MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (20MC Swp)	175.25MC 179.75MC	7			
29.		Connect frequency meter as in step 16.	Not used	Freq. meter to 257MC	13	Not used	A20	Adjust individual channel oscillator slug for audible beat on each channel. Recheck oscillator injection voltage on each channel at point Ⓖ to verify that the voltages are within limits, 2 volts MINIMUM and 5.5 volts maximum.
				251MC	12		A31	
				245MC	11		A32	
				239MC	10		A33	
				233MC	9		A34	
				227MC	8		A35	
				221MC	7		A36	
				129MC	6		A27	
				123MC	5		A28	
				113MC	4		A29	
				107MC	3		A30	
				101MC	2		A31	

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21-T-635, U, 21-T-6125, U, 21-T-6127, U, 24-D-653, U, 24-D-655, U, 24-D-673 U, 24-D-676, U, 24-D-679, U,
24-T-6142, U, 24-T-6285, U, 24-T-6287, U (Ch. KCS97, A, AA, AB, AC, AD, C, D, E, F, H, J, K, N, P, R, T, U, W)

ALIGNMENT INSTRUCTIONS (cont)

UHF TUNER ALIGNMENT

Turn the change-over switch to UHF position. To make RF adjustments for UHF tuner, the unit will have to be removed from the set. IF and oscillator adjustments may be aligned without removing UHF tuner.
It will be necessary to fabricate a test dial to fit over the split gear on the tuner shaft for accurate alignment . Reference marks at 0, 5 and 164 degrees should be scribed on the test dial. Located "0" degree reference point by placing a 1/16" shim between the stop pin on the tuner and the stop plate on the gear assembly with the capacitor plate fully meshed.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
30.	300 pad (Fig. 5)	Across UHF antenna terminals thru 300 pad (Fig. 5)	887.5MC (20MC Swp)	887.5MC 41.25MC 43.5MC 45.75MC	83 (Rotate dial to 164 degrees	Vert. Amp. to point (H). Low side to chassis.	A41, A42, A43	Connect the high side of VHF generator thru a 1000Ω carbon resistor to rear terminal of 1N82 crystal holder and insert markers for 41.25MC, 43.5MC and 45.75MC. Adjust for response curve similar to Fig. 8. Adjust A41 and A42 for maximum overcoupled response curve centered at 887.5MC. Adjust A43 until the 43.5MC marker coincides with the 887.5MC marker.
31.	"	"	473.5MC (20MC Swp)	473.5MC 41.25MC 43.5MC 45.75MC	14 (Rotate Dial to 5 degrees)	"	A44 A45	Adjust A44 until 43.5MC marker coincides with 473.5MC marker and 45.75MC marker as in Fig. 9. Adjust A45 to bring the oscillator trimmer adjustment A44 within range.

32. Repeat steps 30 and 31 until response curves as in Fig. 8 and 9 are obtained. With perfect tracking the three markers will ride on top of the response curve. They may ride down the curve as far as 70% without seriously affecting alignment. If they fall below 70% level, knifing of the RF plates is necessary to correct tracking. It is necessary to remove shield cover to knife RF plates. Always knife the plates while tuning in the lower frequency to avoid affecting the tracking above the point of knifing. A check of which section to knife may be made by touching the plates with the knifing tool while observing the response.

33. Connect the DC probe of a VTVM to point (H). Common to chassis. Set VTVM to 1.5 volts on DC scale. Tune over entire UHF range. Readings between .03 and .35 volts should be obtained. Voltages outside these limits are an indication of low B+ voltages, low or high crystal impedance or an oscillator tube operating outside its allowable limits. Connect the DC probe of VTVM to point (I) which is tuner bias terminal. Common to chassis. VTVM should read .5 and 2.5 volts. Readings outside of these limits will cause crystal current outside allowable limits and in such cases replacement of the oscillator tube should follow. If the oscillator tube is replaced the calibration of the high and low frequency end of the bands is required as outlined above.

FM TRAP ADJUSTMENT

Tune in a local TV station in which interference is noticed. Adjust A46 for minimum interference in picture.

SOUND IF ALIGNMENT

Ground pin 2 (grid) of 3rd. video IF amplifier tube (V5A) to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
34.	.01MFD	High side to pin 7 (grid) of 1st. video IF amp. tube (V6A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (J). Common to chassis.	A49	Adjust for maximum deflection. Peak with core at end of coil away from chassis.
35.	"	"	"	"	"	A47,A48	Adjust for maximum deflection. Peak A48 with core at chassis end.
36.	"	"	"	"	DC probe to point (K). Common to chassis.	A49	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Remove ground from pin 2 of V5A.

4.5MC TRAP ALIGNMENT

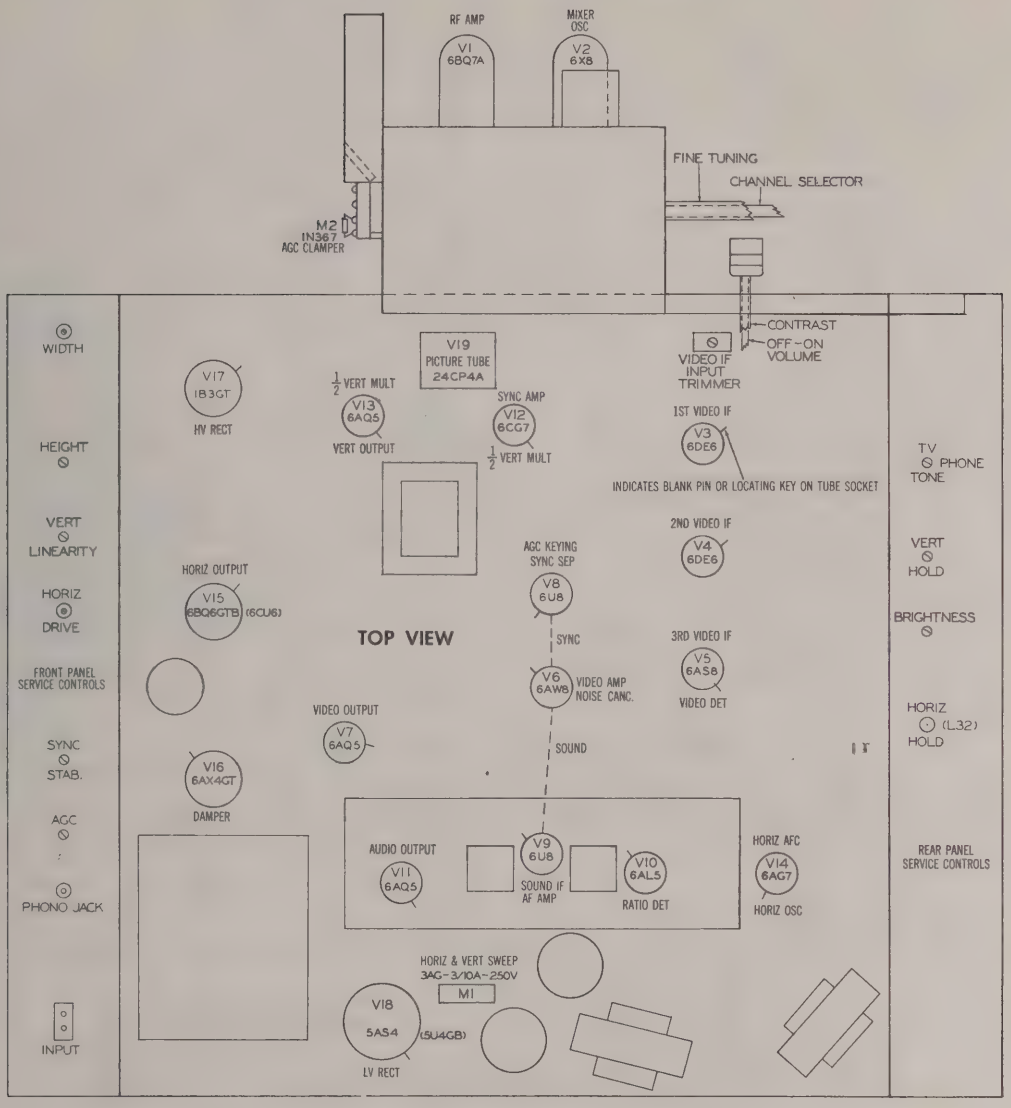
Ground pin 2 (grid) of 3rd. video IF amplifier tube (V5A) to chassis. When properly adjusted core will be away from chassis end of coil.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
37.	.01MFD	High side to pin 7 (grid) of 1st. video IF amp. tube (V6A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru detector (Fig. 1) to pin 2 (grid) of picture tube. Common to chassis.	A50	Increase output of generator for .5 volts on VTVM. Adjust for MINIMUM deflection. Remove ground from pin 2 of V5A. Tune in a TV station. Set contrast and brightness control for a normal picture. Rotate fine tuning control over its range. If 4.5MC beat is noted in picture retouch A50 for MINIMUM 4.5MC beat.

TELEVISION CHANNEL FREQUENCIES

Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier
2	54-60	55.25	59.75	23	524-530	525.25	529.75	44	650-656	651.25	655.75	64	770-776	771.25	775.75
3	60-66	61.25	65.75	24	530-536	531.25	535.75	45	656-662	657.25	661.75	65	776-782	777.25	781.75
4	66-72	67.25	71.75	25	536-542	537.25	541.75	46	662-668	663.25	667.75	66	782-788	783.25	787.75
5	76-82	77.25	81.75	26	542-548	543.25	547.75	47	668-674	669.25	673.75	67	788-794	789.25	793.75
6	82-88	83.25	87.75	27	548-554	549.25	553.75	48	674-680	675.25	679.75	68	794-800	795.25	799.75
7	174-180	175.25	179.75	28	554-560	555.25	559.75	49	680-686	681.25	685.75	69	800-806	801.25	805.75
8	180-186	181.25	185.75	29	560-566	561.25	565.75	50	686-692	687.25	691.75	70	806-812	807.25	811.75
9	186-192	187.25	191.75	30	566-572	567.25	571.75	51	692-698	693.25	697.75	71	812-818	813.25	817.75
10	192-198	193.25	197.75	31	572-578	573.25	577.75	52	698-704	699.25	703.75	72	818-824	819.25	823.75
11	198-204	199.25	203.75	32	578-584	579.25	583.75	53	704-710	705.25	709.75	73	824-830	825.25	829.75
12	204-210	205.25	209.75	33	584-590	585.25	598.75	54	710-716	711.25	715.75	74	830-836	831.25	835.75
13	210-216	211.25	215.75	34	590-596	591.25	595.75	55	716-722	717.25	721.75	75	836-842	837.25	841.75
14	470-476	471.25	475.75	35	596-602	597.25	601.75	56	722-728	723.25	727.75	76	842-848	843.25	847.75
15	476-482	477.25	481.75	36	602-608	603.25	607.75	57	728-734	729.25	733.75	77	848-854	849.25	853.75
16	482-488	483.25	487.75	37	608-614	609.25	613.75	58	734-740	735.25	739.75	78	854-860	855.25	859.75
17	488-494	489.25	493.75	38	614-620	615.25	619.75	59	740-746	741.25	745.75	79	860-866	861.25	865.75
18	494-500	495.25	499.75	39	620-626	621.25	625.75	60	746-752	747.25	751.75	80	866-872	867.25	871.75
19	500-506	501.25	505.75	40	626-632	627.25	631.75	61	752-758	753.25	757.75	81	872-878	873.25	877.75
20	506-512	507.25	511.75	41	632-638	633.25	637.75	62	758-764	759.25	763.75	82	878-884	879.25	883.75
21	512-518	513.25	517.75	42	638-644	639.25	643.75	63	764-770	765.25	769.75	83	884-890	885.25	889.75
22	518-524	519.25	523.75	43	644-650	645.25	649.75								

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V18**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V7, V8, V19**
Has pic, no sound -**V9, V10, V11**
Overloaded picture - **V8**

SYNC FAILURE
No vert. sync - **V12, V13**
No horiz. sync - **V12, V14**
No vert. or horiz. sync - **V6, V8, V12**

SWEEP FAILURE
No raster, has sound - **V14, V15, V16, V17, V19, Fuse (M1)**
No vertical deflection - **V12, V13**
Poor vert. linearity or foldover - **V12, V13**
Poor horiz. linearity or foldover - **V14, V15, V16**
Narrow picture - **V14, V15, V16, V17, V18**
Vert. off freq. - **V12, V13**
Horiz. off freq. - **V12, V14**

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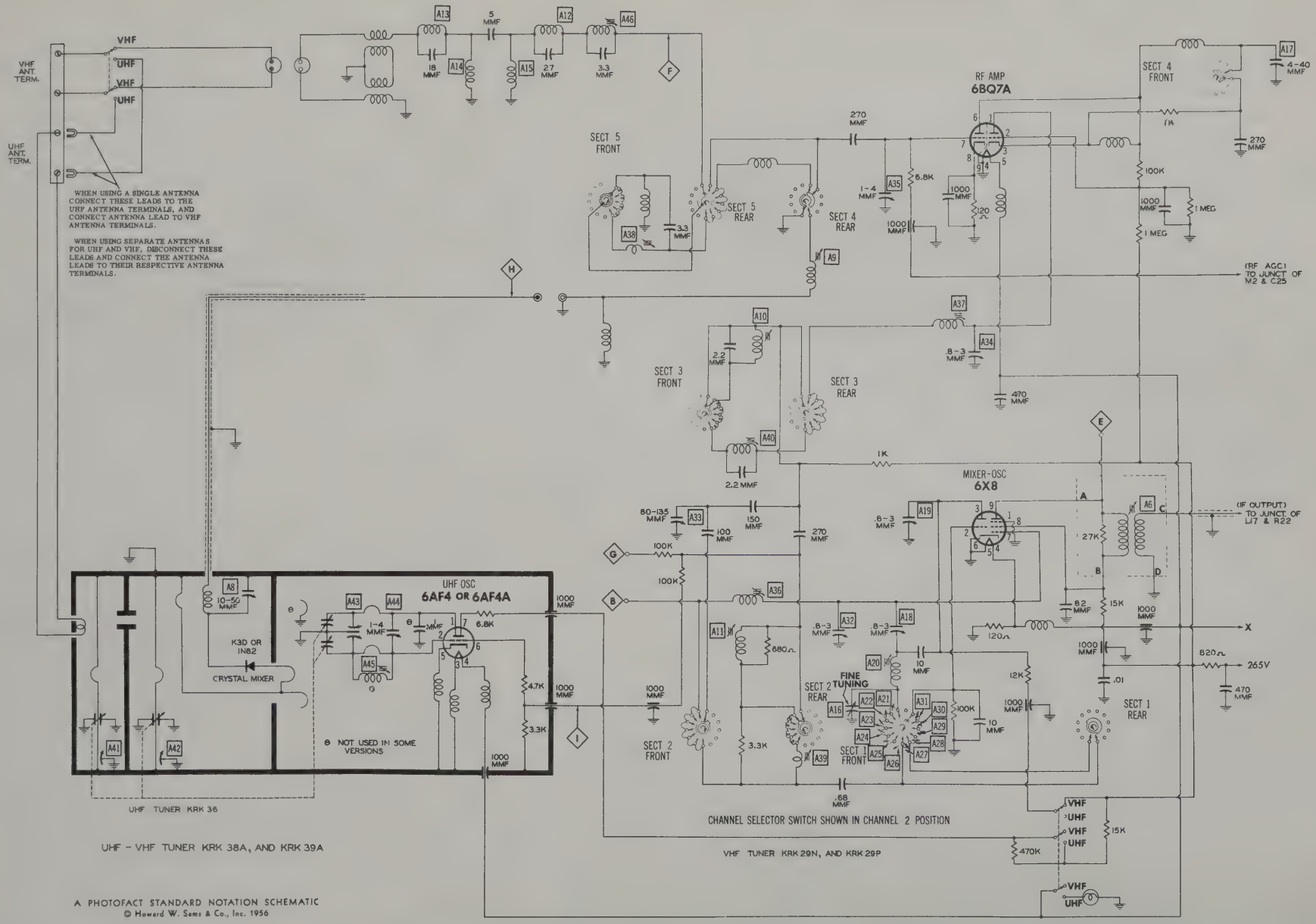

UHF - VHF TUNER KRK 38A, AND KRK 39A

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE UHF-VHF TUNER SCHEMATIC

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: RCA Victor PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BQ7A	6BQ7A	
V2	Mixer-Oscillator	6X8	6X8	
V3	1st. Video IF Amplifier	6DE6	6DE6	
V4	2nd. Video IF Amplifier	6DE6	6DE6	
V5	3rd. Video IF Amplifier-Video Detector	6AS8	6AS8	
V6	Video Amplifier-Noise Canceller	6AW8	6AW8	
V7	Video Output	6AQ5	6AQ5	
V8	AGC Keying-Sync Separator	6U8	6U8	
V9	Sound IF Amplifier-AF Amplifier	6U8	6U8	
V10	Ratio Detector	6AL5	6AL5	
V11	Audio Output	6AQ5	6AQ5	
V12	Sync Amplifier - Vert. Mult.	6CG7	6CG7	
V13	Vert. Mult.- Vert. Output	6AQ5	6AQ5	
V14	Horiz. AFC-Horiz. Osc.	6CG7	6CG7	
V15	Horiz. Output	6BQ6GTB/6CU6	6BQ6GTB/6CU6	
V16	Damper	6AX4GT	6AX4GT	
V17	HV Rectifier	1B3GT	1B3GT	
V18	LV Rectifier	5AS4	5AS4	5U4GB may be used as an alternate

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: RCA Victor PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V19	24CP4A ①	24CP4A/① 24TP4	24CP4 /① 24TP4	24CP4A ② 24CP4	① Aluminized ② Silver screen "85"
	21AMP4A	21AMP4A / ① 21ACP4A 21AMP4/ 21ACP4	21AMP4A/① 21ACP4A	21AMP4A ② 21AMP4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: RCA Victor PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲100	400	100858		C152	FP389.1		Q-020	TVL-4675
B	▲30	50			BR3015	TC39		FMD-305	TVA-2434
C	■10	400							
D	20	50							
C2A	▲100	400	100859		D118	FP332.4	TM-3144	Q-020	TVL-4675
B	■10	400			BR8045			FM-4580	TVA-1716
C	▲80	350							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	270		75199	SI270	D6-270	TP41	GP2K-271	UC-5327	5GA-T27	
C4	1-4		76532		829-4		3115-01-10	CT551		
C5	1000		77084	EF-001	MFT-1000				503C-D1	
C6	470		77293	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C7	1000		77252	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C8	1000		77252	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C9	1-4		76532		829-4		3115-01-10	CT551		
C10	270		75199	SI270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C11	270		75199	SI270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C12	470		75198	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C13	.8-3		77151		829-3		3115-01-0R5	CT565A		
C14	.8-3		77193		829-3		3115-01-0R5	CT565A		
C15	10		33098	N750-SI10	TCN-10	TN01	N750A-100	NT-541	5TCU-Q1	
C16	.8-3		77151		829-3		3115-01-0R5	CT565A		
C17	10		77865	NP0-SI10	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C18	.68		71504		TCZ-R68	TZ02	NP0A-R68			
C19	1000		77252	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C20	1000		77084	EF-001	MFT-1000				503C-D1	
C21	10000		73960	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C22	470		77293	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C23	1000		77084	EF-001	MFT-1000				503C-D1	
C24	470		77293	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C25	.47	200	100299	P288N-47		CUB2P47		PT4047	2TM-P47	
C26	15		39044	N750-SI15	TCN-15	TZ11	N750K-150		5TCU-Q15	
C27	1000		77252	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C28	470		79622	BPD-0047	DD-471	K060	831-471	UC-5347	5GA-T47	
C29	4700		73473	BPD-0047	DD-472	K079	811-0047	DC-525	5HK-D47	
C30	.39	200	79318							
C31	470		77293	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C32	1000		78623	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C33	1000		77252	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C34	4700		73473	BPD-0047	DD-472	K079	811-0047	DC-525	5HK-D47	
C35	1000		78623	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C36	1000		77252	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C37	4700		73473	BPD-0047	DD-472	K079	811-0047	DC-525	5HK-D47	
C38	220		100672	BPD-00022	DD-221	G051	811-221	UC-5322	5GA-T22	
C39	3		101200	NP0-SI3	TCZ-3R3	TZ06	NP0A-030	ZT-553	5TCCB-V33	
C40	1000		77252	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C41	8		101244							
C42	820	500	53119	SI820	D6-821	5W5T82	811-821		1FM-382	
C43	39		73664	N750-SI39	TCN-39	TN12	N750K-390			
C44	9		77108							
C45	.1	600	79149	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C46	.1	600	73557	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C47	.1	400	73551	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No	RATING CAP	RATING VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
					REPLACEMENT DATA					
C48	.0047	400	19017	S14700	D6-472	CUBED47	GP2-333-473	PT6347	67M-D47	
C49	.047	400	73553	BPD-05	DF-503	CUBE47		PT4147	67M-S47	
C50	220		77625	BPD-00022	DD-231	GS51	SU-231	UC-5322	5GA-T22	
C51	.0039	400	79018	S147000	D6-402	CUBED4	GP2-333-402	PT634	67M-D4	
C52	10000		73960	BPD-01	DD-103	K082	8U-01	50K-81	58K-81	
C53	.47	200	73787	P388N-47		CUB4P47		PT4047	27M-P47	
C54	3		76507		TCN-3R3		N750A-3R3			
C55	39		100350				N330L-390			
C56	56		79324	N750-S156	TCN-56	TN16	N750K-560			
C57	10000		73960	BPD-01	DD-103	K082	8U-01	DC-51	58K-81	
C58	10000		73960	BPD-01	DD-103	K082	8U-01	DC-51	58K-81	
C59	10000		73960	BPD-01	DD-103	K082	8U-01	DC-51	58K-81	
C60	.47	200	73787	P388N-47		CUB3P47		PT4047	27M-P47	
C61	1000	500	79652	BPD-001	DD-102	1W5D1	801-001	MC555	1FM-31	
C62	.0027	1000	73599							
C63	.01	400	79315	BPD-01	D6-103	CUB481	GP3-333-103	PT411	47M-S1	
C64	.0033	400	79315	S13300	D6-332	CUB6D33	GP2-333-332	PT6333	67M-D33	Note 1
C65	.01	200	79014	BPD-01	D6-103	CUB481	GP3-333-103	PT411	47M-S1	
C66	.0068	400	79019							
C67	270	500	79535	S1270	D6-271	5W5T27	GPK-271	MC541	1FM-327	
C68	.0033	600	73595	S13300	D6-322	CUBED33	GP2-333-332	PT6333	67M-D33	Note 2
C69	.0018	1000	73651							Note 3
C70	.33	200	79740	P288N-33		CUB2P33		PT4033	37M-P33	
C71	10000		73960	BPD-01	DD-103	K082	8U-01	DC-51	58K-81	
C72	.1	600	79149	P588N-1		DF-104	CU5B81		PT901	67M-P1
C73	330	500	79540	S1330	D6-331	5W5T33	GPK-331	MC533	1FM-333	
C74	330	500	79640	S1330	D6-331	5W5T33	GPK-331	UC-5333	1FM-333	
C75	.033	400	73552	BPD-03	DF-303	CUB6S33		PT6133	67M-S33	
C76	.027	600	73552	BPD-001	DD-103	K082	801-001	DC-51	58K-81	
C77	.01	400	73561	BPD-01	D6-103	K082	GP3-333-103	PT411	47M-S1	
C78	.0022	600	73595	1454-0022		1R5D22		MS-322	MS-247	
C79	.0047	600	73920	1454-0047		1R5D47		MS-347	MS-247	
C80	.022	600	73798	BPD-02	DF-203	CUB6S22	617-03	PT4122	67M-S22	
C81	.047	400	73553							
C82	.01	400	73561	BPD-01	D6-103	CUB481	GP3-333-103	PT411	47M-S1	
C83	.068	200	79320	P288N-068		CUB2P68		PT4068	47M-P68	
C84	.0033	400	79315	1454-0033		1R5D33		MS-333		
C85	.015	200	79530							
C86	.027	600	79695							
C87	.001	1500	73949	HVD-30-1000	DD30-102	CUB1K01	1R5KV-102	PT5321	MB-D1	
C88	220	500	79536	S1220	D6-221	5W5T22	GPK-221	MC540	1FM-322	
C89	82	1000	79674					MC1462	10GA-Q82	
C90	68	1000	79675	HVD-15-68	DD-680	VQ68	1R5KV-680	MC1468	10GA-Q68	
C91	.1	400	79151	P488N-1		DF-104		PT401	47M-S1	
C92	.022	400	79923	BPD-02	DF-203	CUB4S23	617-03	PT4123	47M-S23	
C93	.47	200	99534	P288N-47		CUB2P47		PT4047	27M-P47	
C94	330	1000	76416							
C95	.01	600	73594							
C96	.0012	600	79695	1454-0012		1R5D12	811-123		MB-312	
C97	680	1000	79798	HVD-15-680	DD-681	V768	1R5KV-681	MC1368	10GA-T68	
C98	.1	600	73567	P688N-1		DF-104	CUB6P1	PT601	67M-P1	
C99	.1	200	79796							
C100	270	1000	76579	HVD-15-370	DD-871	VT97		MC1327	10GA-T27	
C101	.047	1000	73597	P1088N-047		CUB10S47		PT1015	MG-247	
C102	.1	400	73551	P488N-1		DF-104	CUB4P1	PT401	47M-P1	
C103	.1	400	73551	P488N-1		DF-104	CUB4P1	PT401	47M-P1	
C104	560	1000	76330			DD-561			10GA-T56	
C105	330	1500	101395	HVD-15-330	DD30-331	MC1T333	1R5KV-331	MC1333	15GAB-T33	
C106	270	3500	100184		DD30-271	VT2T7			30GA-T27	
C107	150	3500	100653	HVD-30-150	DD30-151	V3T15	5KV-151		30GA-T15	
C108	150			HVD-30-150	DD30-151	V3T15	5KV-151		30GA-T15	

Note 1. Chassis KCS97, KCS97A, KCS97N and KCS97P use .0047MFD in this application (part #73820).
Note 2. Chassis KCS97AD use .01MFD in this application. Chassis KCS97, KCS97A, KCS97N and KCS97P use .01MFD in this application (part #73561).
Note 3. Chassis KCS97, KCS97A, KCS97N and KCS97P use .0022MFD in this application (part #73803).

CONTROLS

ITEM No	RATING RESIST ANCE	RATING WATTS	RCA Victor PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
					REPLACEMENT DATA			
R1A	2500Ω	½	100681	F1-15	RTV-544	QJ-8H ●	UP33R	Contrast (Panel)
B	1Meg			R2-57			UR16-T25 †	Volume (Rear) Tap at 200KΩ
C	Switch			KS-1			US-38	Attach to R1B.
R2A	200KΩ	½	100685	B-46	A47-200K-S	Q11-129	U-43	Brightness
B	Shaft		Not Req.	Not Req.	F8-3	Not Req.	Not Req.	Attach to R2A.
R3A	1.5Meg	½	100686	AB-742	A47½.5Meg-S	Q11-136	TA15L	Vertical Hold
B	Shaft		Not Req.	AK-3	F8-3	Not Req.	Not Req.	Attach to R3A.
R4A	5Meg	½	100310	AB-97	A47-5Meg-S	Q11-141	SU-97	Height
B	Shaft		Not Req.	AK-19	R8-3	TQ	Not Req.	Attach to R4A.
R5A	2.5Meg	½	100684	BX-83	A47½.5Meg-S	Q11-139	TA35L	Vertical Linearity
B	Shaft		Not Req.	Not Req.	FK8-1/4	SQ	Not Req.	Attach to R5A.
R6A	2Meg	½	100683	BX-75	A47-2Meg-S	Q11-138	TA3L	Sync StabiLizer
B	Shaft		Not Req.	Not Req.	FK8-1/4	SQ	Not Req.	Attach to R6A.
R7A	500KΩ	½	100682	AB-81		Q17-133	TA25R	AGC
B	Shaft		Not Req.	AK-1		SQ	Not Req.	Attach to R7A.

† Universal Replacement (Mallory Exact Duplicate Part No. UE4128).
● Concentrikit Equivalent, K-6 Kit, Base Elements and Shafts, B17-111, P17-105 (Panel)
B12-137X, B1-118 (Rear)
78-1 (Switch)

RESISTORS

ITEM No	RATING OHMS	RATING WATT	RCA Victor PART No.	IRC PART No.	NOTES
			REPLACEMENT DATA		
R6	6800Ω	½	504268	BTS-6800	
R9	100KΩ	½	504410	BTS-100K	
R10	120Ω	½	503512	BTS-120	
R11	1Meg	½	503510	BTS-1Meg	
R12	1Meg	½	503510	BTS-1Meg	
R13	1000Ω	½	100686	BTS-1000	
R14	100KΩ	½	504410		Note 1
R15	12KΩ	2	523312		
R16	100KΩ	2	523410		
R17	100KΩ	½	502410		
R18	3300Ω	1	502223		
R19	15KΩ	2	523315		
R20	1200	½	503512	BTS-120	
R21	8200	½	503512	BTS-820	
R22	560Ω	½	502156		
R23	1000Ω	½	502310	BTS-1000	
R24	47KΩ 5%	½	502247	BTS-47K 5%	
R25	680Ω	½	502168	BTS-680	Note 3
R26	390Ω	½	30488	BTS-390	
R27	56Ω	½	502056	BTS-56	
R28	10KΩ	½	502310	BTS-10K	
R29	150K 5%	½	502415	BTS-150K 5%	
R30	820Ω	½	502182	BTA-820	
R31	42000Ω	7	100846		
R32	150KΩ 5%	½	502415		
R33	680Ω	½	502168	BTS-680	
R34	27Ω	½	502027	BTS-27	
R35	470Ω	½	502247	BTS-470	
R36	130Ω 5%	½	502113	BTS-130 5%	
R37	47Ω	½	502047	BTS-47	
R38	10KΩ	2	522310	BTB-10K	
R39	3000Ω 5%	1		BTA-3000 5%	Note 2
R40	180Ω	½	502118	BTS-180	
R41	470KΩ	½	502447	BTS-470K	
R42	1800Ω	2	522218	BTB-1800	
R43	100Ω	2	522118	BTB-100	
R44	560Ω	½		BTA-560	
R45	470KΩ	½	502447	BTS-470K	

RESISTORS (cont)

ITEM No	RATING OHMS	RATING WATT	RCA Victor PART No.	IRC PART No.	NOTES
			REPLACEMENT DATA		
R46	3000Ω 5%	1		BTS-3000 5%	Note 4
R47	15Ω	½	502315	BTS-15K	
R48	150KΩ	½	502415	BTS-150K	
R49	220KΩ	½	502423	BTS-220	
R50	47KΩ	½	502347	BTS-47K	
R51	220KΩ	½	502422	BTS-220K	
R52	56KΩ	½	502356	BTS-56K	
R53	150KΩ 5%	½	502415	BTS-150K 5%	
R54	33KΩ	½	502333	BTS-33K	
R55	47KΩ	½	502347	BTS-47K	
R56	56KΩ 5%	½	502368	BTS-68K 5%	
R57	1Meg 5%	½	502510	BTS-1Meg 5%	
R58	56KΩ 5%	½	502356	BTS-56K 5%	
R59	39KΩ	½	502339	BTS-39K	
R60	330KΩ	½	502433	BTS-330K	
R61	270Ω	½	502127	BTA-270	
R62	15KΩ	½	502315	BTS-15K	
R63	47KΩ	½	502347	BTS-47K	
R64	12KΩ	½	502312	BTS-12K	
R65	1000Ω	½	502310	BTS-1000	
R66	10KΩ 5%	½	502310	BTS-10K 5%	
R67	10KΩ 5%	½	502310	BTS-10K 5%	
R68	39KΩ	½	502339	BTS-39K	
R69	100KΩ	½	502410	BTS-100K	Note 5
R70	10Meg	½	502610	BTS-10Meg	
R71	330KΩ	½	502433	BTS-330K	
R72	470KΩ	½	502447	BTS-470K	
R73	560Ω	½	502156	BTA-560	
R74	2300Ω	7	101280	SW7-2300	
R75	27KΩ	½	502327	BTS-27K	
R76	470KΩ	½	502447	BTS-470K	
R77	560KΩ	½	502456	BTS-560K	
R78	33KΩ	½	502333	BTS-33K	
R79	1800Ω 5%	½	502218	BTS-1800 5%	
R80	2200Ω 5%	½	502222	BTS-2200 5%	
R81	22KΩ	½	502322	BTS-22K	
R82	82KΩ	½	502382	BTS-82K	
R83	270KΩ	½	502427	BTS-270K	
R84	1.2Meg	½	502512	BTS-1.2Meg	
R85	1Meg	½	502510	BTS-1Meg	
R86	1Meg	½	502510	BTS-1Meg	
R87	33KΩ	½	502333	BTS-33K	
R88	560KΩ	½	502456	BTS-560K	
R89	2700Ω 5%	1	502227	BTS-2700 5%	
R90	68000Ω	½	502368	BTS-68K	
R91	22KΩ 5%	½	502322	BTS-22K 5%	
R92	18KΩ	½	502318	BTS-18K	
R93	6.8Meg	½	502568	BTS-6.8Meg	
R94	470KΩ	½	502447	BTS-470K	
R95	56KΩ	½	502356	BTS-56K	
R96	3.9Meg	½	502539	BTS-3.9Meg	
R97	1Meg	½	502510	BTS-1Meg	
R98	470KΩ	½	502447	BTS-470K	
R99	18KΩ 5%	½	502318	BTS-18K 5%	
R100	15KΩ	½	502315	BTS-15K	
R101	8200Ω	½	502282	BTS-8200	
R102	330KΩ	½	502433	BTS-330K	
R103	470KΩ	½	502447	BTS-470K	
R104	22KΩ	½	502322	BTS-22K	
R105	22KΩ 5%	1	512322	BTA-22K 5%	
R106	1MΩ	½	512115	BTA-150	
R107	560Ω	½			
R108	560Ω	½			
R109	220KΩ	½	502422		
R110	330KΩ	½	502433	BTS-330K	
R111	820KΩ	½	502482		
R112	150KΩ 5%	½	502415		
R113	82KΩ 5%	½	502382	BTS-82K 5%	
R114	3900Ω	1	502239		
R115	100KΩ	½	502410	BTA-100K	
R116	6.8Meg	½	502568		
R117	47KΩ	½	502247	BTS-47K	
R118	330KΩ	½	502433	BTS-330K	
R119	39KΩ	½	512339		
R120	1Meg	½	502510		
R121	47Ω	½	503047		
R122	6800Ω	2	522268	BTB-6800	
R123	1000Ω	2	74015	BWU-100	
R124	270KΩ	½	502427	BTS-270K	
R125	68KΩ	½	502368	BTS-68K	
R126	2200Ω	½	502222	BTS-2200	
R127	4700Ω	½	502247		
R128	.68Ω	1	100845	BW½-.68	
R129	1000Ω	½	502310	BTS-1000	
R130	100KΩ	½	502410	BTS-100K	
R131	27Ω	½		BTS-27	Note 6

Note 1. Some versions use a 22Ω ½W resistor in this application. (Mfgr. Part No. 502023).
Note 2. Some versions use a 2700Ω 1W 5% resistor in this application. (Mfgr. Part No. 512227).
Note 3. Some versions use a 680Ω ½W resistor in this application. (Mfgr. Part No. 502168).
Note 4. Some versions use a 3300Ω ½W resistor in this application. (Mfgr. Part No. 502233).
Note 5. A 47KΩ ½W resistor is used in chassis KCS97, KCS97N, KCS97P. (Mfgr. Part No. 502347).
Note 6. Not used in some versions.

TRANSFORMER (POWER)

ITEM No	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
					REPLACEMENT DATA					
T1	117VAC	560VCT	5VAC	6.3VAC	100855					
	μ 1.76A	280ADC	μ 3A	μ 9.1A						

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	RCA Victor PART No.	Halldorson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
		REPLACEMENT DATA							
T2	Horiz. Output Trans.	100860	FB446 ●	HVO-36 ●		X128 ●	A-8244 ●	FLY-60 ●	D-50 ●
T3	Vert. Output Trans.	100867	Z1900 ② ③ ④ ⑤	A-3823 ① ②		V307 ③ ④ ⑤	A-8145 ③ ④ ⑤	38072 ③ ④ ⑤	A-108X ① ②
T4A	Yoke(90°)Horiz. (16.5MH)	101447 ⑤	DF607 ③ ④	MDF-93 ⑤ ⑦		Y90F19/93 ③ ⑤	DY-16A ③ ⑤	Y-18 ③ ⑦	Y-61-③ ⑤
B	Vert. (28MH)								
T5A	Width Series Coil (.5-3.4MH)	100853		MWC-10				WC-24	
B	Parallel Coil (3.4-18MH)								

① Drill new mounting hole(s).
② Use 7 to 1 turns ratio.
③ Connect as auto transformer.
④ Connect B+ to point of original transformer red lead (yoke socket Pin #1).
⑤ Complete with plug; Capacitor C106; Resistors R107, R108.
⑥ Use original horizontal yoke damping network, with capacitor C108 across terms #3 and #7.
⑦ Connect horizontal yoke term #3 to yoke plug Pin #4, horizontal yoke terms #1 & #7 to plug Pin #5, horizontal yoke term #1 to plug Pin #6.

●HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
5	5	9	5	5	5	9
4	4	7	4	4	4	7
3	3	5	3	3	3	5
2	2	3	2	2	2	3
1	1		1			
Connect Width Coil Across	1 & 2	1 & 3	1 & 2	1 & 2	1 & 2	1 & 3

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI.	IMPEDANCE SEC.	RCA Victor PART No.	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
			REPLACEMENT DATA						
T6	6.6KΩ	16Ω	100857 100856 ①	Z1066	A-2902	A-3852	26S45	S-92	① Audio Output Transformer used in Chassis KCS97, KCS97A, KCS97N, and KCS97P.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	RCA Victor PART No.	GUAM PART No.	RCA TYPE No.	NOTES
				REPLACEMENT DATA			
SP1	8"	PM	3.2Ω	74884	8A21	30832	① Used in Models 24-D-673, 24-D-673U,
SP2	8"	PM	3.2Ω	74884	8A21	30832	24-D-678, and 24-D-678U
	6" x 9"	PM	3.2Ω	100182 ①	69A2	23881	② Used in Models 21-T-6125, 21-T-6127,
	5"	PM	3.2Ω	77000 ②	5A07	20582	21-T-6125U, and 21-T-6127U

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	RCA Victor PART No	MEISSNER PART No.	MERIT PART No	MILLER PART No	NOTES
				REPLACEMENT DATA				
L1	RF Choke	0Ω		77859				
L2	Ant. Coils	0Ω		78802				Note 1
L3	Ant. Coil	0Ω		78802				Note 1
L4	RF Choke	0Ω		77206				
L5	Neut. Coil	0Ω		78552				
L6	IF Trap	.4Ω		78486				
L7	RF Coil	0Ω		77931				Channel 13-Note 2
L8	RF Coils	0Ω		78802				Note 3
L9	RF Coil	0Ω		73480				Channel 6-Note 2
L10	Mixer Grid Coil	0Ω		77919				Channel 13-Note 3
	Mixer Grid Coils	0Ω		78800				Note 3
L12	Mixer Grid Coil	0Ω		73874				Channel 6-Note 3
L13	Osc. Coil	0Ω		78068				Channel 13-Note 4
L14	Osc. Coils	0Ω		78068				Note 4
L15	IF1 Choke	0Ω		78067				
L16	Conv. Plate	.3Ω	.1Ω	78390				Includes 27KΩ resistor
L17	47.25MC Trap	.1Ω		78204		TY-152	6225	
L18	1st Video IF	.8Ω	.3Ω	78203	17-6223	TY-150	6219	
L19	IF2 Choke	0Ω						
L20	2nd Video IF	.8Ω	.8Ω	74015				
L21	IF1 Choke	0Ω		100427				
L22	3rd Video IF	.8Ω	.8Ω	100285				
L23	4th Video IF	.8Ω	.8Ω	100287				
L24	Series Peaking Coil	3.8Ω		100350	19-3036	TY-160	6178	36 Microhenries
L25	Shunt Peaking Coil	13.5Ω		101587	19-3260	TY-168	6181	250 Microhenries
L26	Series Peaking Coil	7.2Ω		101386	19-3180 ●	TY-154 ●	6180 ●	150 Microhenries, Wound on 6.8KΩ resistor
L27	Shunt Peaking Coil	12.5Ω		101390	19-3300 ●		6185 ●	300 Microhenries, Wound on 680Ω resistor
L28	4.5MC Trap	8Ω		101386				
L29	Series Peaking Coil	5.3Ω		101380	19-4123	TY-163	6178	120 Microhenries, Wound on 22KΩ resistor
L30	Sound IF	2.6Ω		101230	17-1081		1470	
L31	Ratio Det.	10.5Ω	.8Ω	101319				Tertiary winding - .6Ω
L32	RF Choke	.72Ω		78640	19-1001		6804	1.5 Microhenries, IRC Part No. CL-1

Note 1. Stator complete with rotor and coils. Complete assembly Part No. 78802.
Note 2. Stator complete with rotor, C30, L7 thru L8 and R13. Complete assembly Part No. 73801
Note 3. Stator complete with rotor, coils, capacitors, and resistors. Includes C11, C12, C18, L10 thru L12, R16, R17 and R18. Complete assembly Part No. 78800.
Note 4. Stator complete with rotor, coils. Includes L13 and L14. Complete assembly Part No. 79068.
● Parallel with 6.8KΩ resistor.
■ Parallel with 680Ω resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No	DC RES. PRI.	DC RES. SEC.	RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	Triad PART No.	NOTES
			REPLACEMENT DATA								
L33	25Ω	63Ω	78966								Horiz. Osc. Horiz. Wave-shaping Coil
L34	80Ω		100300								

FILTER CHOKE

ITEM No	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (@ CURRENT 1000 ~)	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
				REPLACEMENT DATA					
L35	280ADC	38Ω	1.25HY	77878	C5037 ①	C-3998 ①	C-2336 ①	36C44 ①	C-17X ①

① Drill one new mounting hole.

FUSES

ITEM No	TYPE	RATING	RCA Victor PART No. FUSE	RCA Victor PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No FUSE	BUSS PART No HOLDER
			REPLACEMENT DATA					
M1	3AG	3/10A 250V	28214	78218	312.300 (3AG 3/10A,	257001	AGC 3/10	4405

CRYSTAL DIODES

ITEM No	ORIG TYPE	RCA Victor PART No.	SYLVANIA PART No	NOTES
		REPLACEMENT DATA		
M2	1N387	100844	1N34A	AGC Clamper

RCA VICTOR MODELS 21-D-641, U, 21-D-645, U, 21-D-648, U, 21-D-652, U, 21-D-667, U, 21-D-670, U, 21-T-635, U, 21-T-6125, U, 21-T-6127, U, 24-D-655, U, 24-D-658, U, 24-D-673, U, 24-D-676, U, 24-T-6142, U, 24-T-6283, U, 24-T-6287, U (Ch. KCS97, A, AA, AB, AC, AD, C, D, E, F, H, J, K, N, P, R, T, U, W)

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

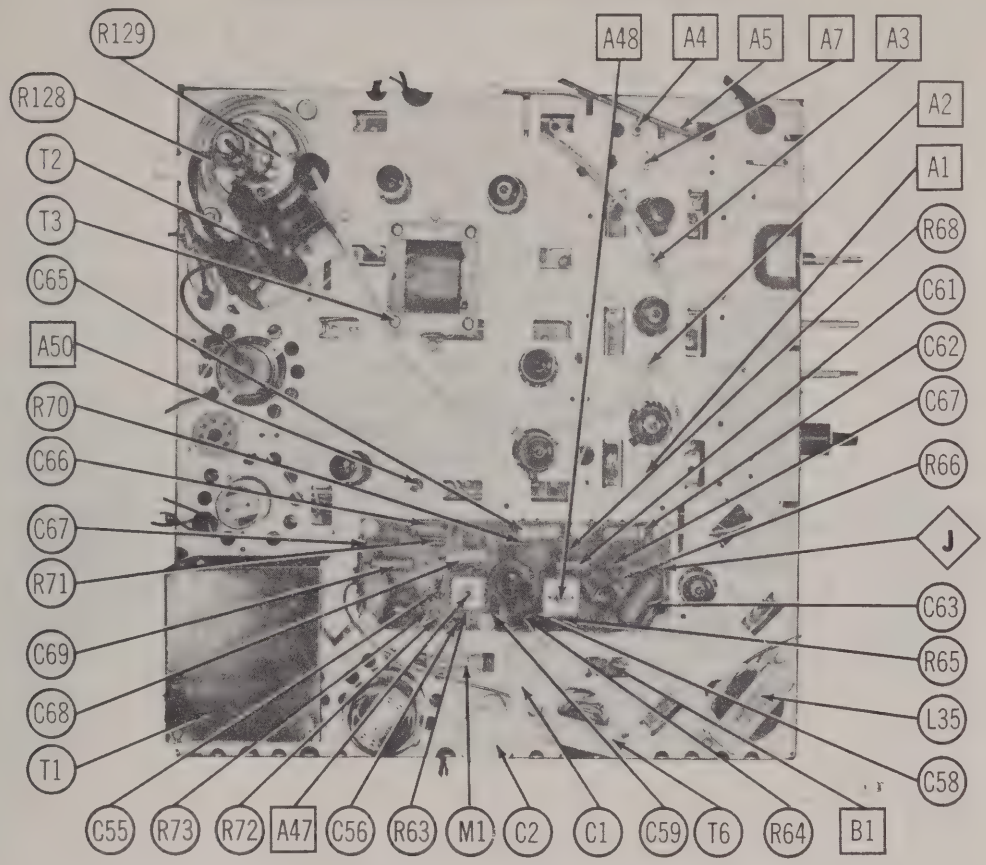
ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M3	Dial Light	11891	VHF Indicator (#44) - Chassis KCS97W, KCS97AB, KCS97AD, KCS97U, KCS97AA, KCS97AC, KCS97E, KCS97H, KCS97K
M4	Dial Light	11891	UHF Indicator (#44) - Chassis KCS97W, KCS97AB, KCS97AD, KCS97P, KCS97T, KCS97H, KCS97K, KCS97A, KCS97E
M5	Tuner	KRK38*	UHF - Chassis KCS97U, KCS97AA, KCS97AC, KCS97D, KCS97F, KCS97J
	Tuner	KRK38B	VHF - Chassis KCS97
	Tuner	KRK38F	VHF - Chassis KCS97N, KCS97R
M6	Tuner	KRK38A †	VHF-UHF-Chassis KCS97E, KCS97H, KCS97K, KCS97W, KCS97AB, KCS97AD - Note 1
	Tuner	KRK38E	VHF-UHF - Chassis KCS97P, KCS97T - Note 2
	Tuner	KRK38C	VHF-UHF - Chassis KCS97A - Note 2
M7	Ant. Match. Unit	100454	
M8	Switch	101242	TV-phono-tone (Rotary-wafer type)
M9	Switch	100890	VHF-UHF (Slide type) VHF-UHF models only
M10	Focus Magnet	10l129	Includes centering device
M11	Ion Trap	76141	
M12	Correction Magnet	78556	Chassis KCS97U, KCS97W, KCS97AA, KCS97AB, KCS97AC, KCS97AD, KCS97N, KCS97P, KCS97R, KCS97T
M13	Correction Magnet	78556	Chassis KCS97U, KCS97W, KCS97AA, KCS97AB, KCS97AC, KCS97AD, KCS97N, KCS97P, KCS97P, KCS97R, KCS97T
A17	Trimmer Cap.	77616	IF Trap trimmer (4-40MMF)
A5	Trimmer Cap.	100851	Video IF input trimmer (5-70MMF)
B3	Trimmer Cap.	79376	Horiz. Drive (10-160MMF)
	Knob	79132	Brightness & vert. hold - All models
	Knob	10l150	VHF channel selector - Dark wine - Models 24D655, U, 21D641, U, 21D645, U
	Knob	10l152	VHF channel selector - Taupe - Models 24D655, U, 24D658, U, 24D673, U, 24D676, U, 24D679, U, 21D641, U, 21D645, U, 21D648, U, 21D652, U, 21D670, U
	Knob	10l151	VHF channel selector - Dark wine - Models 24D676, U, 21D667, U
	Knob	10l153	VHF channel selector - mocha - Models 24D679, U, 21D647, U, 21D648, U
	Knob	100944	VHF channel selector - Dark wine - Models 21T635, 21T6125, 24T6285
	Knob	100945	VHF channel selector - Taupe - Models 24T6287, 21T635, 21T6127
	Knob	101258	VHF channel selector - Maroon - Model 24T6142
	Knob	10l141	UHF tuning - Dark wine - Models 24D655U, 21D641U, 21D645U, 24T6285U, 21T635U, 21T6125U
	Knob	10l142	UHF tuning - Taupe - Models 24D655U, 24T6287U, 21T635U, 21T6127U, 24D658U, 21D641U, 21D645U, 21D648U, 21D652U
	Knob	10l144	UHF tuning - Models 24D673U, 24D676U, 24D679U, 21D667U, 21D670U
	Knob	10l143	UHF tuning - Mocha - Models 21D647U, 21D648U
	Knob	101256	UHF tuning - Maroon - Model 24T6142U
	Knob	101259	UHF - VHF channel selector - Maroon - Model 24T6142U
	Knob	100946	UHF-VHF channel selector - Dark wine - Models 24T6285U, 21T635U, 21T6125U
	Knob	100947	UHF-VHF channel selector - Taupe - Models 24T6287U, 21T635U, 21T6127U
	Knob	10l124	Contrast - Models 24D655, U, 24D658, U, 24D673, U, 24D676, U, 24D679, U, 21D641, U, 21D645, U, 21D647U, 21D648, U, 21D652, U, 21D667, U, 21D670, U, 24T6285, U, 24T6287, U, 21T6125, U, 21T6127, U, 21T635, U
	Knob	100622	Contrast - Models 24T6142, U
	Knob	10l154	Fine tuning - Models 24D655, U, 24D658, U, 24D673, U, 24D676, U, 24D679, U, 21D641, U, 21D645, U, 21D647, U, 21D648, U, 21D652, U, 21D667, U, 21D670, U
	Knob	101260	Fine tuning - Models 24T6142, U
	Knob	101276	Fine tuning - Models 24T6285, U, 24T6287, U, 21T6125, U, 21T6127, U, 21T635, U
	Knob	79866	Horiz. hold - All models
	Knob	100621	On-off-volume - Taupe - Models 24D655, U, 24D658, U, 21D641, U, 21D645, U, 21D648, U, 21D652, U, 24T6287, U, 21T635, U, 21T6127, U
	Knob	10l138	On-off-volume - dark wine - Models 24D655, U, 21D641, U, 21D645, U, 24T6285, U, 21T635, U, 21T6125, U
	Knob	10l137	On-off-volume - Taupe - Models 24D673, U, 24D676U, 24D679, U, 21D670, U
	Knob	10l139	On-off-volume - Dark wine - Models 24D676, U, 21D667, U
	Knob	10l183	On-off-volume - Mocha - Models 24D679, U
	Knob	10l140	On-off-volume - Mocha - Models 21D647, U, 21D648, U
	Knob	100620	On-off-volume - Maroon - Models 24T6142, U
	Knob	79133	TV-phono-tone - all models
	Safety Glass	78872	Models 24D655, U, 24D658, U, 24D673, U, 24D676, U, 24D679, U
	Safety Glass	79839	Models 24T6142, U, 24T6285, U, 24T6287, U
	Safety Glass	79235	Models 21D641, U, 21D645, U, 21D647, U, 21D648, U, 21D652, U, 21D667, U, 21D670, U, 21T6125, U, 21T6127, U, 21T635, U
	Mask	78864	Models 24D655, U, 24D658, U, 24D673, U, 24D676, U, 24D679, U
	Mask	10l130	Models 21D641, U, 21D645, U, 21D647, U, 21D648, U, 21D652, U, 21D667, U, 21D670, U, 21T6125, U, 21T6127, U, 21T635, U

Note 1. Tuner part #KRK38A or KRK39A consists of VHF tuner part #KRK29N or KRK29P and UHF tuner part #KRK36.

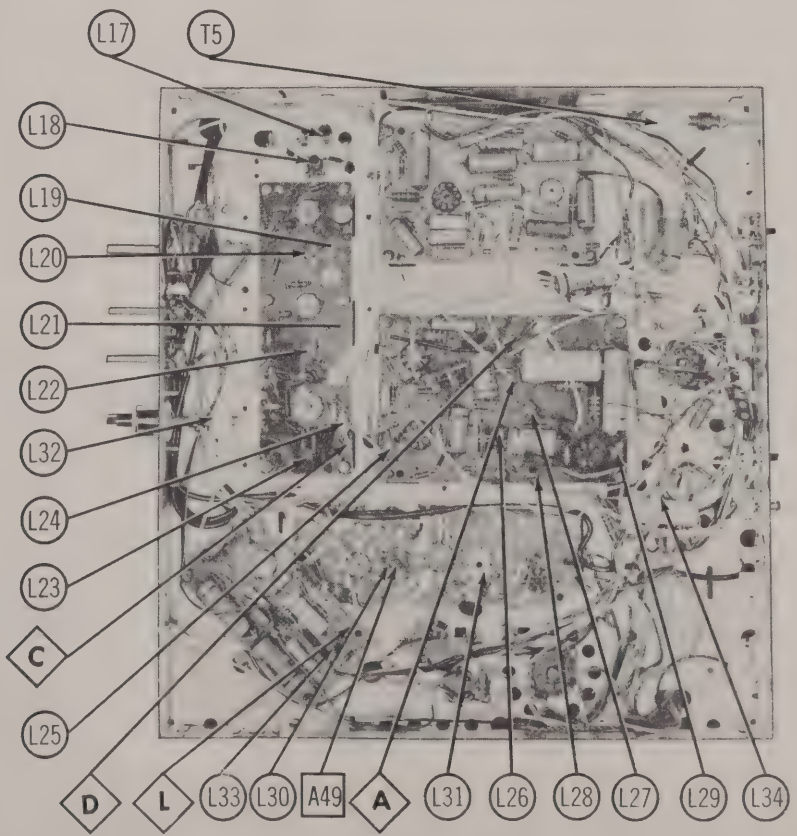
Note 2. Tuner part #KRK38E and KRK38C consists of VHF tuner part #KRK29N and UHF tuner part #KRK38.

* Alternate part #KRK39.

† Alternate part #KRK39A.



CHASSIS TOP VIEW

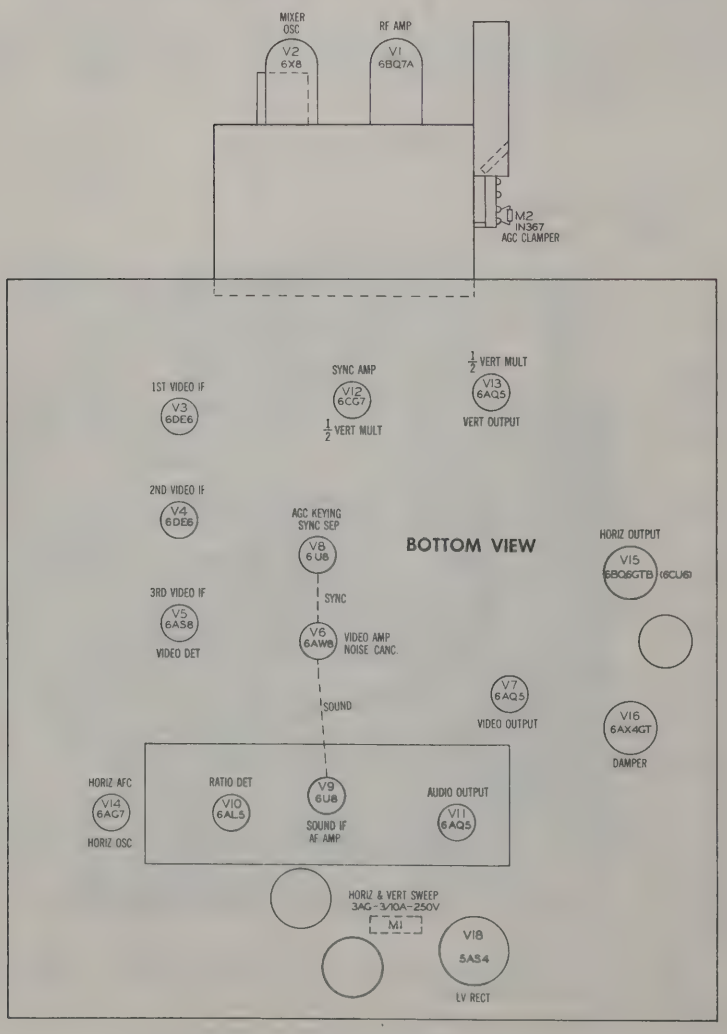


CHASSIS BOTTOM VIEW-TRANS.. INDUCTOR AND ALIGNMENT IDENTIFICATION

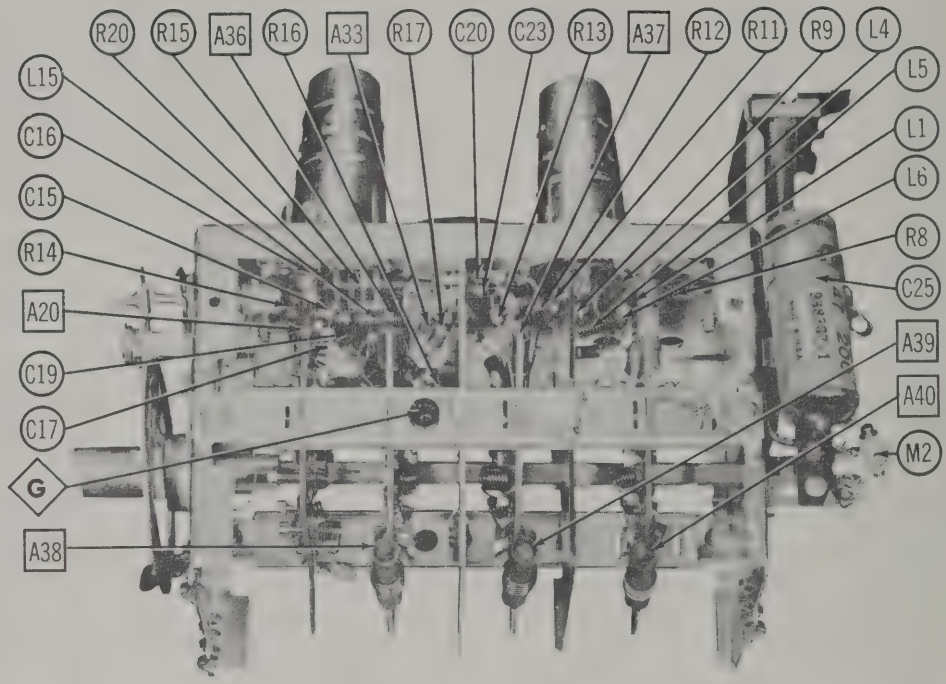
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	† L 9KΩ	500KΩ	600KΩ	0Ω	. 1Ω	600KΩ	200KΩ	120Ω	0Ω
V 2	6X8	0Ω	100KΩ	† 12KΩ	. 1Ω	0Ω	0Ω	100KΩ	† 15KΩ	† 15KΩ
V 3	6DE6	60KΩ	56Ω	0Ω	. 1Ω	▲ 680Ω	▲ 680Ω	0Ω		
V 4	6DE6	50KΩ	▲ 27Ω	0Ω	. 1Ω	† 700Ω	† 700Ω	INF		
V 5	6AS8	† 4. 2KΩ	. 8Ω	180Ω	. 1Ω	0Ω	4KΩ	0Ω	47Ω	† 4. 2KΩ
V 6	6AW8	2. 2KΩ	1Meg	† 33KΩ	. 1Ω	0Ω	180Ω	4KΩ	† 4. 5KΩ	†13KΩ
V 7	6AQ5	470KΩ	700Ω	0Ω	. 1Ω	† 4KΩ	† 300Ω	470KΩ		
V 8	6U8	† 1Meg	† 35KΩ	† 300Ω	0Ω	. 1Ω	200KΩ	† 4. 5KΩ	0Ω	2. 2Meg
V 9	6U8	† 330KΩ	47KΩ	† 18KΩ	. 1Ω	0Ω	† 5. 5KΩ	0Ω	0Ω	10Meg
V 10	6AL5	INF	INF	0Ω	. 1Ω	10KΩ	0Ω	10KΩ		
V 11	6AQ5	470KΩ	560Ω	. 1Ω	0Ω	† 3. 7KΩ	† 3. 3KΩ	470KΩ		
V 12	6CG7	† 14KΩ	33KΩ	0Ω	0Ω	. 1Ω	● 1. 5Meg	2. 5Meg	0Ω	0Ω
V 13	6AQ5	2Meg	0Ω	. 1Ω	0Ω	† 500Ω	† 200Ω	2Meg		
V 14	6CG7	† 40Ω	1. 5Meg	230KΩ	0Ω	. 1Ω	† 39KΩ	250KΩ	0Ω	0Ω
V 15	6BQ6GTB/ 6CU6	TP	0Ω	NC	† 6. 8KΩ	750KΩ	TP	. 1Ω	100Ω	TOP CAP ● 18Ω
V 16	6AX4GT	NC	NC	800KΩ	NC	† 40Ω	NC	. 1Ω	0Ω	
V 17	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ● 344Ω
V 18	5AS4	NC	40KΩ	NC	29Ω	NC	33Ω	NC	40KΩ	
V 19	24CP4A	0Ω	470KΩ	PIN 10 ● 300KΩ	PIN 11 † 220KΩ	PIN 12 . 1Ω				

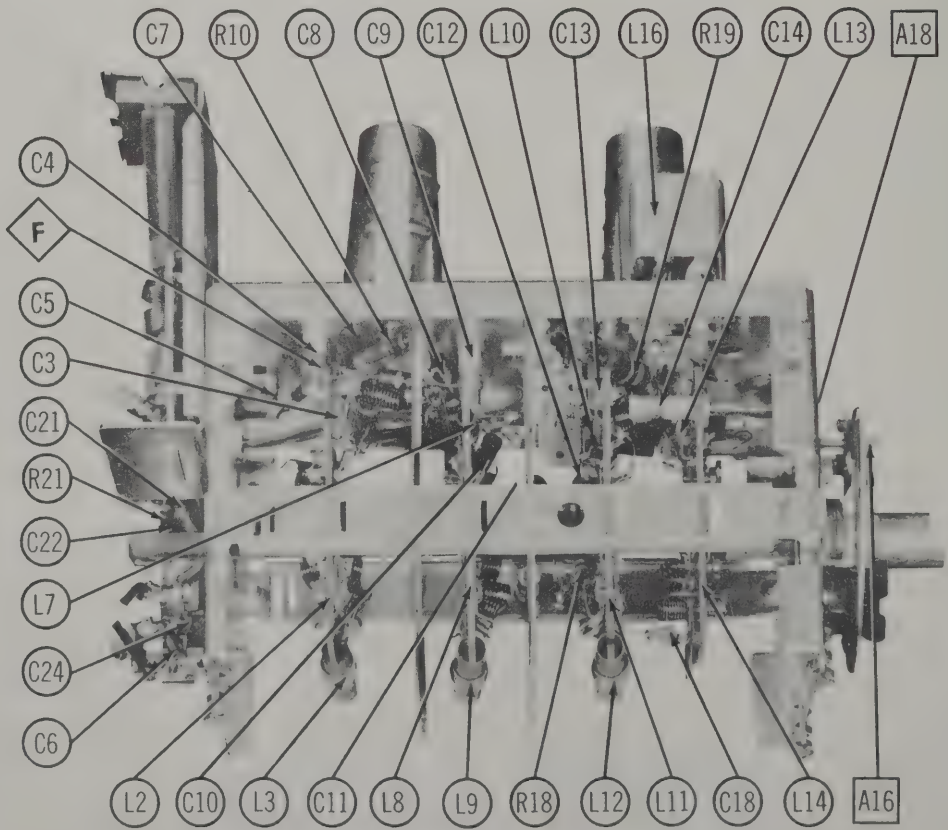
† MEASURED FROM PIN 2 OF V18.
▲ MEASURED FROM PIN 7 OF V4.
● MEASURED FROM PIN 3 OF V16.
NC-NO CONNECTION.
TP-TIE POINT.



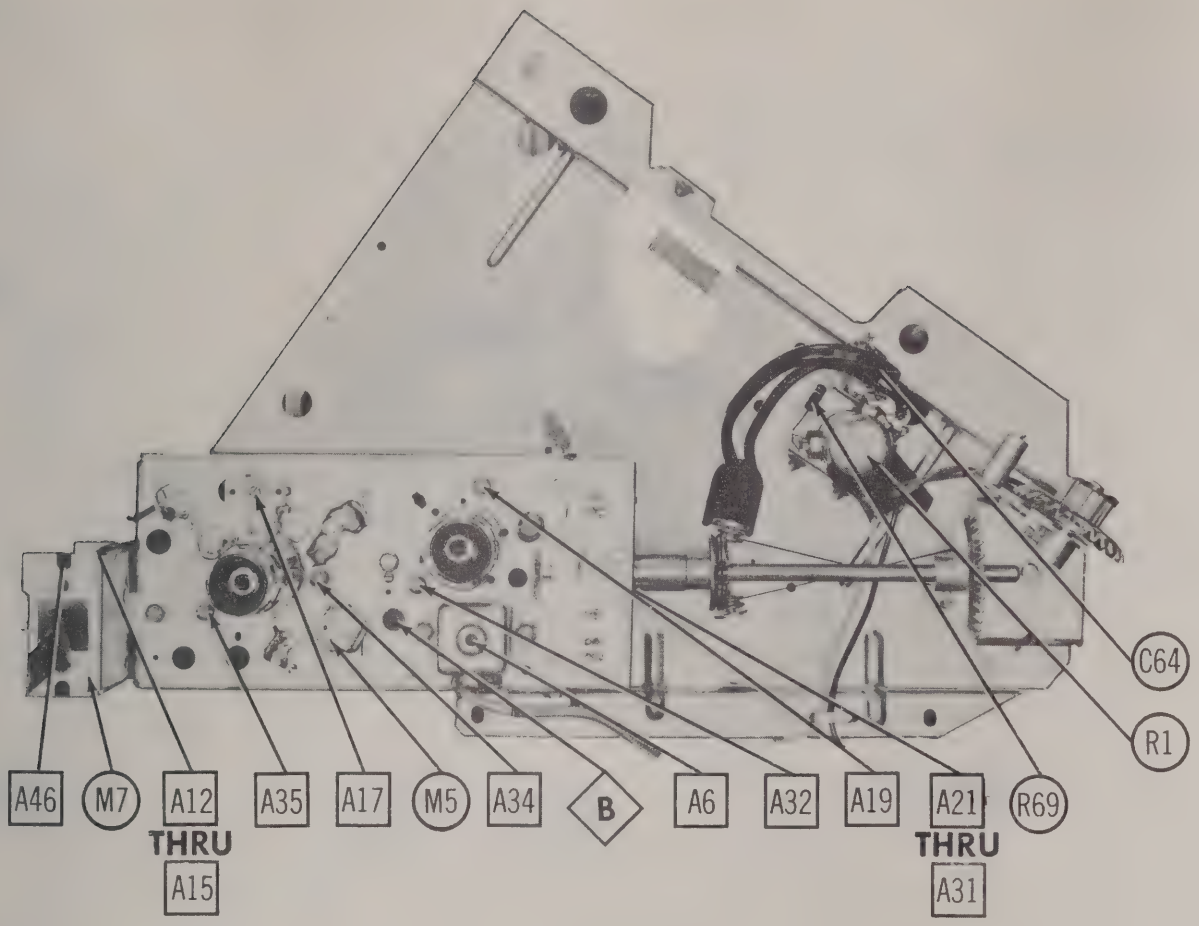
TUBE PLACEMENT CHART



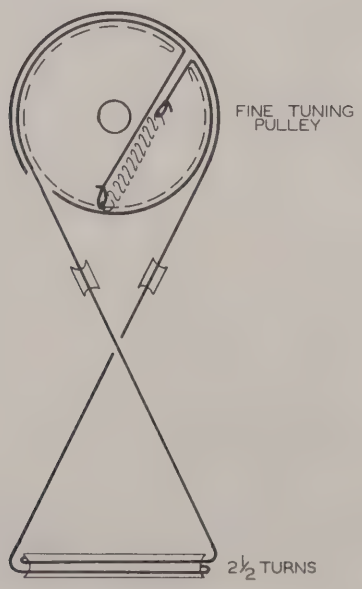
RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

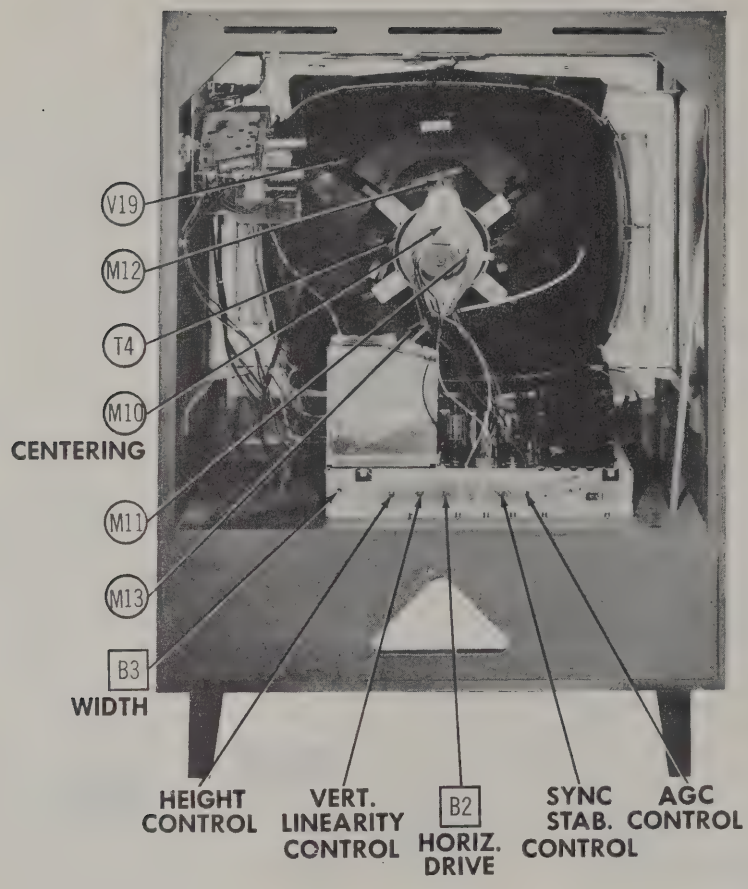


RF TUNER TOP VIEW & ASSEMBLY



FINE TUNING PULLEY IN MAX. COUNTER CLOCKWISE POSITION

VHF DRIVE CORD STRINGING



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in TV station, preferably a test pattern.

A. CHECK OF HORIZONTAL HOLD ADJUSTMENTS

1. Turn the horizontal hold control fully clockwise. Approximately 12 diagonal bars should be sloping downward to the left. Turn the horizontal hold control slowly counter clockwise until $1\frac{1}{2}$ to 3 diagonal bars are present on the screen. The picture should pull in sync upon slight additional rotation of the horizontal hold adjustment and remain in sync for approximately an additional two turns in a counter clockwise direction. Further counter clockwise rotation should cause picture to lose sync with 2 to 5 diagonal bars present before motor boating occurs. Interrupted oscillation (motorboating) should occur before maximum counter clockwise rotation of the horizontal hold adjustment is reached.

2. If the receiver does not pass the above check, turn the horizontal width slug (B3) maximum counter clockwise. Adjust the horizontal drive trimmer (B2) counter clockwise for a bright vertical line near center of the screen, then turn clockwise until line disappears. Set brightness control for maximum brightness and adjust B3 for a picture slightly wider than necessary to fill the picture mask horizontally. Adjust the horizontal waveform slug (B1) until 3 or 4 bars are present before motorboating occurs when the horizontal hold adjustment is turned counter clockwise from the point at which picture loses sync.

3. If the picture still will not sync properly and the AGC control and sync stabilizer control is properly adjusted, it will be necessary to perform the adjustments outlined under "Horizontal Hold and Waveform Alignment".

B. HORIZONTAL HOLD AND WAVEFORM ADJUSTMENT

The horizontal waveform adjustment is adjusted at the factory and normally will require no readjustment.

If the horizontal hold coil (L32) or the horizontal waveform coil (L33) are replaced in set, scope adjustment will be necessary to synchronize the picture.
Short out L33 with a clip lead and turn the horizontal hold slug all the way out. Rotate horizontal hold slug back in coil until picture locks in sync.
Remove short from L33. Connect the low capacity probe of an oscilloscope to terminal point (1) on schematic. Low side to chassis. Adjust the horizontal waveform slug (B1) until the waveform on scope is similar to Fig. 10. If necessary, during adjustment of B1 keep picture in sync with the horizontal hold control.
Remove the oscilloscope from point (1).
The sync action should now be as outlined in paragraphs 1 and 2 of "Check of Horizontal Hold Adjustment". If necessary readjust the horizontal drive trimmer and horizontal width slug as in paragraph 2 of "Check of Horizontal Hold Adjustment".

AGC AND SYNC STABILIZER CONTROL ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern. Connect the vertical amplifier of an oscilloscope to pin 1 (grid) of video output tube (V7). Connect the low side to chassis. Turn the sync stabilizer control (R6) fully counter clockwise. Adjust scope to see video waveform.
From a counter clockwise position turn the AGC control (R7) clockwise until sync tips begin to become compressed, then back counter clockwise just enough to remove compression. If the AGC control is set too far clockwise on a weak signal it may overload when receiving a strong signal.
Set the horizontal hold adjustment as far counter clockwise as possible without making horizontal sync unstable.
Turn R6 clockwise until sync tips begin to become compressed, then back counter clockwise just enough to remove compression. Reset the horizontal hold to its center range position and remove scope from pin 1 of V7.

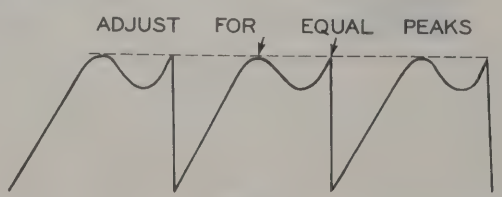
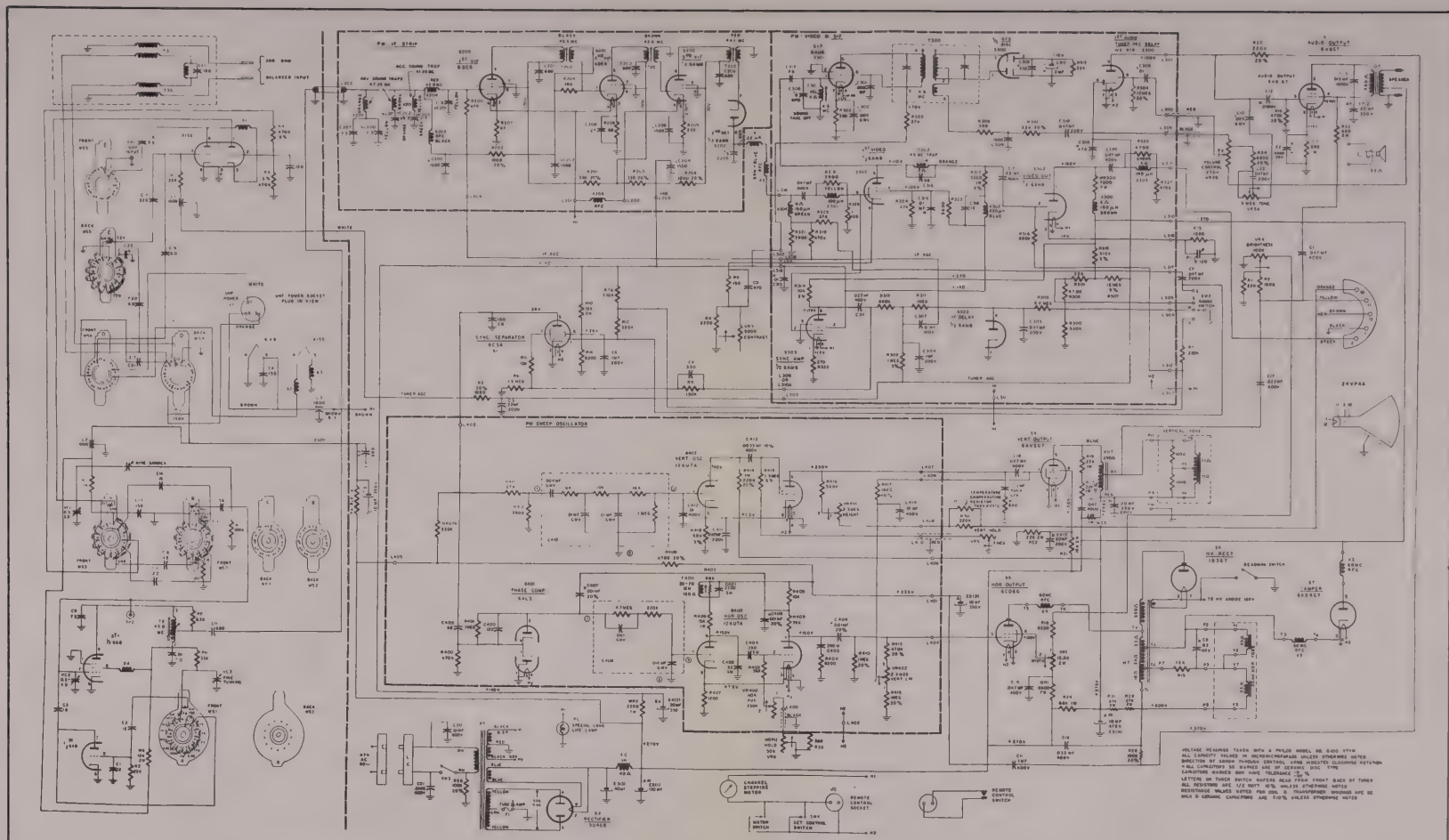


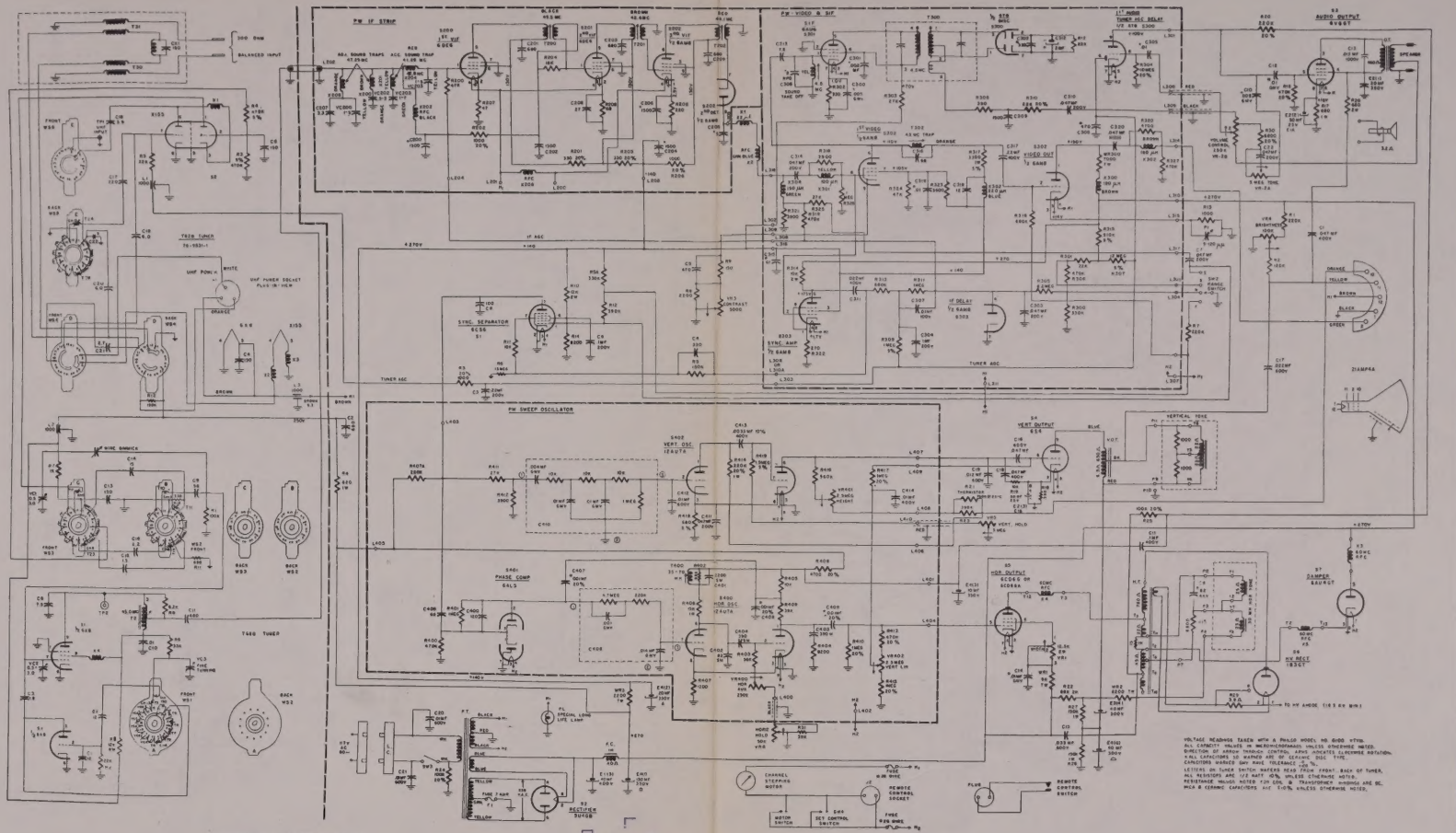
FIG. 10



PHILCO MODELS

24D6126L	(Ch. TV-444)	24D6320C	(Ch. TV-444)
24D6126M	(Ch. TV-444)	24D6320M	(Ch. TV-444)

SCHEMATIC COURTESY PHILCO CORP.



PHILCO MODELS

22D4148	(Ch. TV-440)	22D4162L	(Ch. TV-440)
22D4148L	(Ch. TV-440)	22D4163	(Ch. TV-440)
22D4162	(Ch. TV-440)	22D4164	(Ch. TV-440)

SCHEMATIC COURTESY PHILCO CORP.

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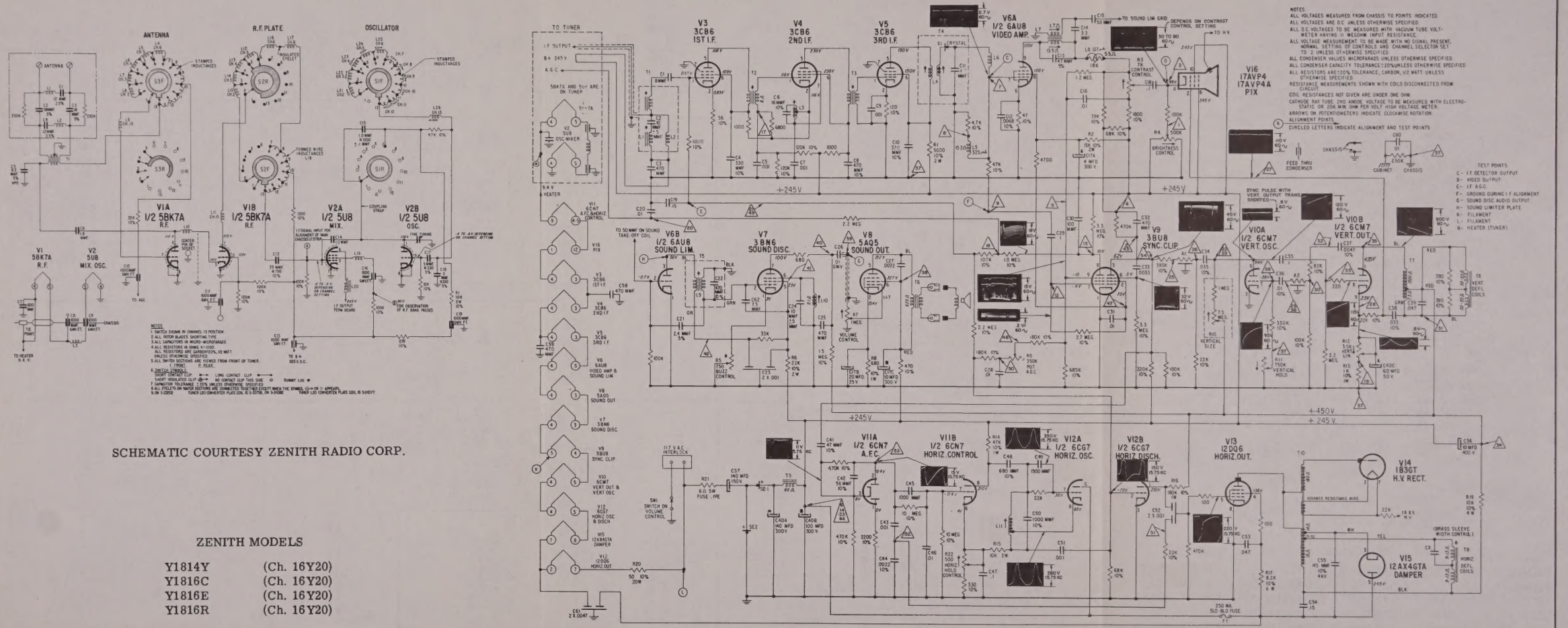
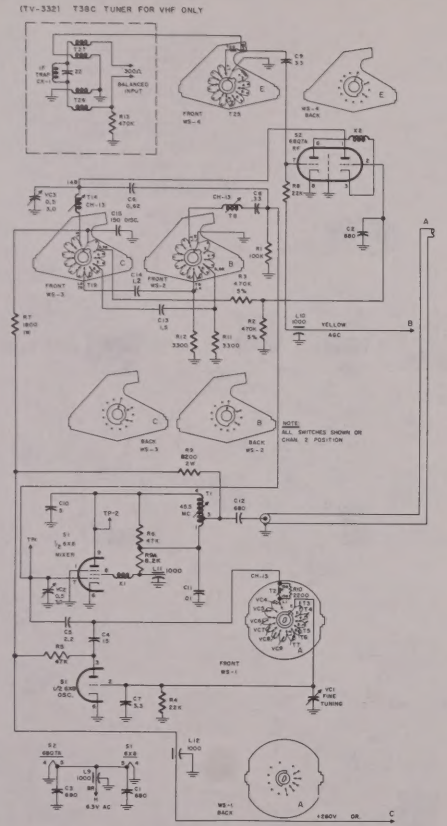
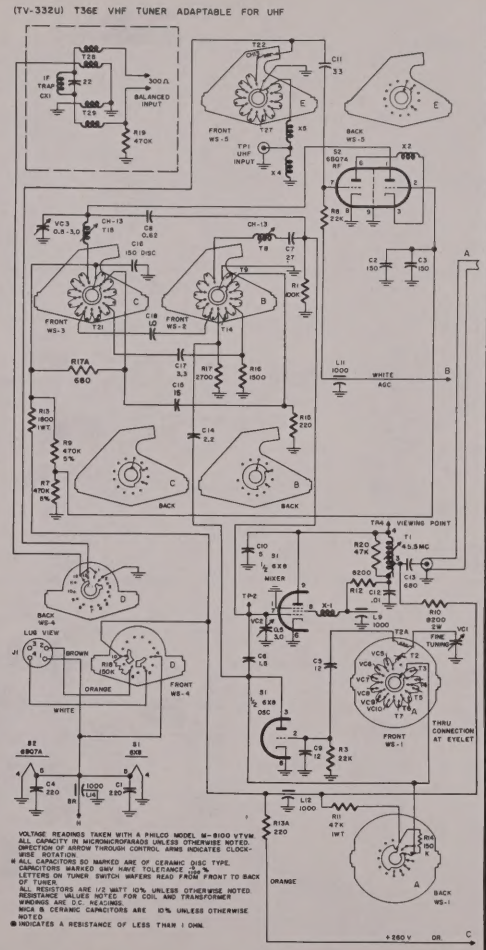


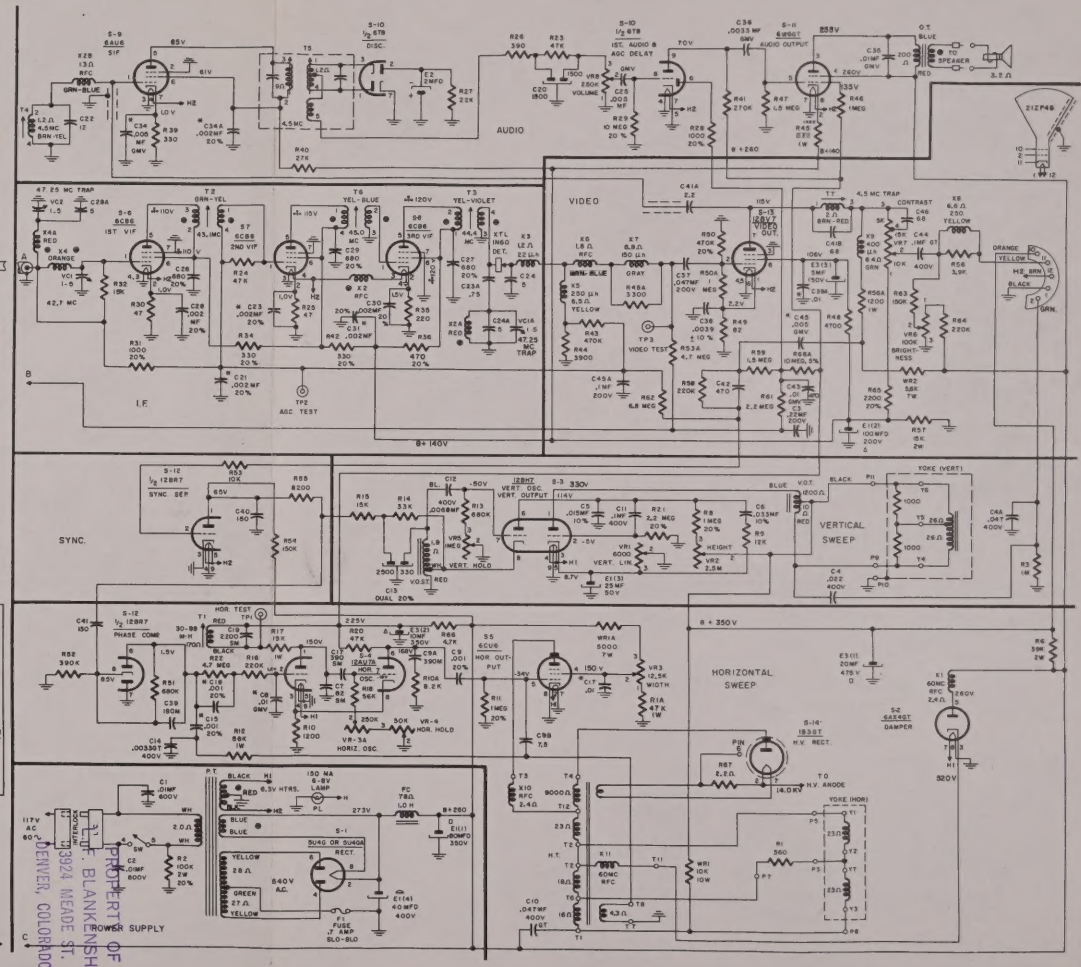
SCHEMATIC COURTESY ZENITH RADIO CORP.

ZENITH MODELS

Y1814Y	(Ch. 16Y20)
Y1816C	(Ch. 16Y20)
Y1816E	(Ch. 16Y20)
Y1816R	(Ch. 16Y20)




(TV-332U) T36E VHF TUNER ADAPTABLE FOR UHF
VOLTAGE READINGS TAKEN WITH A PHILCO MODEL M-8100 VTVM.
ALL CAPACITY IN MICROMICROFARADS UNLESS OTHERWISE NOTED.
DIRECTION OF ARROW THROUGH CONTROL ARMS INDICATES CLOCKWISE ROTATION.
ALL CAPACITORS SO MARKED ARE OF CERAMIC DISC TYPE.
CAPACITORS MARKED GMV HAVE TOLERANCE OF ±20%.
LETTERS ON TUNER SWITCH WAFERS READ FROM FRONT TO BACK OF TUNER.
ALL RESISTORS ARE 1/2 WATT 10% UNLESS OTHERWISE NOTED.
RESISTANCE VALUES NOTED FOR COIL AND TRANSFORMER WINDINGS ARE D.C. READINGS.
MICA & CERAMIC CAPACITORS ARE 10% UNLESS OTHERWISE NOTED.
INDICATES A RESISTANCE OF LESS THAN 1 OHM.



PHILCO MODELS

22D4033G, U	(Ch. TV-332,U)	22D4139L, U	(Ch. TV-332,U)
22D4033L, U	(Ch. TV-332,U)	22D4321L, U	(Ch. TV-332,U)
22D4135,U	(Ch. TV-332,U)	22D4321M, U	(Ch. TV-332,U)
22D4137, U	(Ch. TV-332,U)	22D4321T, U	(Ch. TV-332,U)
22D4137L, U	(Ch. TV-332,U)	22D4321W, U	(Ch. TV-332,U)
22D4139, U	(Ch. TV-332,U)		

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